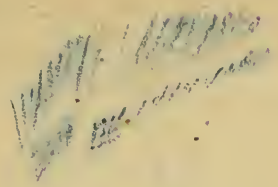

The Egyptian Papyrus, or Paper Rush:
Taken from Prosper Alpinus.

HISTORICAL ACCOUNT

OF THE

SUBSTANCES

WHICH HAVE BEEN USED TO

DESCRIBE EVENTS, AND TO CONVEY IDEAS,

FROM THE

EARLIEST DATE

TO THE

INVENTION OF PAPER.

SECOND EDITION.

PRINTED ON PAPER MANUFACTURED SOLELY FROM STRAW.

By MATTHIAS KOOPS, Esq.

LONDON:

PRINTED BY JAQUES AND CO. LOMBARD STREET, FLEET STREET.

1801.

TO

HIS MOST EXCELLENT MAJESTY

GEORGE THE THIRD,

KING

OF

THE UNITED KINGDOMS

OF

GREAT-BRITAIN

AND

IRELAND.

MOST GRACIOUS SOVEREIGN.

SIRE,

YOUR MAJESTY having been Moſt Graciouſly pleaſed to grant me Patents for extracting printing and writing ink from waſte Paper, by reducing it to a pulp, and converting it into *white Paper*, fit for writing, printing, and for other purpoſes; and alſo for manufacturing Paper from Straw, Hay, Thiſtles, waſte and refuſe of Hemp and Flax, and different kinds of Wood and Bark, fit for printing, and almoſt all other purpoſes for which Paper is uſed,

And

And YOUR MAJESTY having in September laſt year condeſcended to permit me to lay at Your feet the firſt uſeful Paper which has ever been made from Straw alone* without any addition of rags; the Gracious Reception it has met with from YOUR MAJESTY, the approbation of the Publick; and the encouragement which the Legiſlature has given me by paſſing an Act of Parliament in its favour has engaged me to reprint theſe lines on Paper manufactured from Straw ſolely in a more improved ſtate, although not yet brought to ſuch a ſtate of perfection as it will be made in a regular manufacture, which muſt be entirely

* Part of this Edition is printed on Straw Paper.

conſtructed

conſtructed for ſuch purpoſe, and which I moſt humbly flatter myſelf will now much ſooner be eſtabliſhed by the indulgence which YOUR MAJESTY's Parliament has granted me. This new Eſſay proves, there cannot be any doubt that good and uſeful Paper can be made from Straw alone.

The favourable manner in which YOUR MAJESTY has deigned to look on theſe my humble attempts of diſcovery ſhall be a conſtant incitement to future exertions, and the proſpect of meriting commendation of a KING, always ready to countenance the moſt humble endeavours which tend to the common welfare, and who has proved

Himſelf

Himſelf the Illuſtrious Patron and Protector of Arts and Sciences, obliges me to unremitted perſeverance to bring my attempts to perfection, in the proſpect of meriting YOUR MAJESTY's commendation, which will be the greateſt pleaſure I can be ſenſible of.

With the moſt ardent wiſhes for YOUR MAJESTY's health and longevity, and with all poſſible deference and humility, I beg leave, MOST GRACIOUS SOVEREIGN, to ſubſcribe myſelf,

YOUR MAJESTY's
moſt devoted,
moſt obedient,
and moſt humble Servant,

MATTHIAS KOOPS.

17, James-ſtreet,
Buckingham-gate,
Auguſt 30, 1801.

THE art of Paper-making ought to be regarded as one of the moſt uſeful which has ever been invented in any age or country; for it is manifeſt, that every other diſcovery muſt have continued uſeleſs to ſociety if it could not have been diſſeminated by manuſcripts, or by printing.

Scientific men, who were neither artiſts nor manufacturers, have, by means of this invention, been enabled to communicate their projects, which mechanics have afterwards improved and perfected, and by this means enriched the commonwealth.

Without the uſe of Paper, geography and navigation muſt have been very incorrectly underſtood; the beautiful charts of the ocean ſo accurately laid down have eſtabliſhed our commercial intercourſe with every part of the globe with ſafety; at the ſame time that the delineations upon maps of places, rivers, and countries, are now ſo correct, that they enable a traveller to proceed without danger, and even predict, with certainty, the time it will require to convey him to any part of the globe.

It may be aſſerted, indeed, of this country, that its grandeur and commercial dignity have been greatly exalted by the invention of Paper; for it is preſumed, that the ſuperiority which diſtinguiſhes the manufactures of this Iſland, chiefly depends upon the liberal publications concentered from all the reſt of the world, which have ſo greatly increaſed in latter years, and which are likely farther

farther to be augmented. It is, in ſhort, the reputation of the goods fabricated in Great-Britain, which has elevated it to the ſplendour and fame it now poſſeſſes, in the ſcale of nations, and enables it to monopolize the trade of the univerſe.—All theſe are benefits which have flowed from the invention of Paper, and which have ſo largely contributed to the preſent flouriſhing ſtate of the country.

What infinite trouble and labour, what a fruitleſs conſumption of time has not been ſaved by the knowledge of Paper! how many laborious and dangerous experiments have not philoſophical projectors been ſpared! what labour of inveſtigation and ſtudy have not been abridged by the events which the experiments of others have handed down to poſterity! thereby affording to the preſent age a body of information more than adequate to the knowledge any one man could

have attained to in a thouſand years, with all his faculties.

This reflection alone muſt fix ſuch an impreſſion on any thinking mind of the invaluable utility of Paper, as to render any further commendation unneceſſary; but in ſhort, the inventions of Paper and Printing have been the cauſes of the various gradations of improvement in every art and ſcience. Without it, the preſent age would neither have been more civilized nor wiſer than it was many centuries ago, becauſe one age could never have conveyed to its poſterity what the labours of the paſt had atchieved; for it is well known that, in dark and barbarous ages, the inhabitants of no country have ever made any progreſs towards improvement and civilization without the uſe of Writing, Printing, and Paper; and it ſeems very probable, that the early knowledge of this article amongſt the Chineſe has been the cauſe of thoſe acquire-

acquirements which have diſtinguiſhed that truly wonderful nation: for it may be affirmed, that in proportion to the quantity of Paper conſumed, by any ſtated number of inhabitants in literary purſuits, ſo will be their comparative information, civilized ſtate, and improvement.

To enumerate all the various advantages which the invention of Paper has afforded mankind, could not be contained in an Eſſay of this nature: its uſes are unqueſtionable; and the important ſervices it has yielded to all countries where it has been employed are not to be calculated; it is ſufficient to ſay here, that the growing youth are educated with facility in the principles of their duty, and barbarous ſtates have been ſoftened and enlightened by means of this diſcovery.

Although this ſubject might be much enlarged upon, the intention of this Ad-

dreſs is moſt humbly to preſent to *Your Moſt Gracious Majeſty* the *firſt* uſeful Paper manufactured *ſolely* from *Straw*, and on which theſe lines are printed.

From the remarks which have been already made, every perſon muſt be convinced, that it is of the utmoſt conſequence to prevent the ſcarcity of the materials from which Paper is to be fabricated. Although cotton has been likewiſe uſed for this purpoſe, paper-makers in this country have depended on linen Rags for the regular purſuit of their employment.

All Europe has of late years experienced an extraordinary ſcarcity of this article, but no country has been ſo much injured by it as England. The greatly advanced price, and the abſolute ſcarcity, equally operating to obſtruct many printing-preſſes in this kingdom; and various works remain, for theſe reaſons, unpubliſhed, which might

might have proved very ſerviceable to the community.

The great demands for Paper in this country have rendered it neceſſary to be ſupplied from the continent with Rags. This ſupply is extremely precarious, and is likely to be more wanted as the conſumption of Paper increaſes, becauſe this material, which is the baſis of Paper, is not to be obtained in England in ſufficient quantity. The evil conſequence of not having a due ſupply of Rags has been the ſtoppage of a number of Paper-mills; and as it is a manufactory which requires numerous hands (of men, women, and children); a great number of them have been thrown upon their reſpective pariſhes for want of employment. A ſtill more important conſideration, in the view of commerce, preſents itſelf, when the raw material comes from abroad, becauſe the importation of it is paid in hard caſh,

the preparation of which might have employed numbers of idle hands at home advantageouſly.

Theſe reflections induced me to make various experiments, with a view to remedy, in ſome degree, this evil; and, after many trials, I have the ſatisfaction to remark, that I have diſcovered ſeveral ſubſtitutes for linen Rags, which have been heretofore untried and unknown, and which will merit the attention of the public. One of theſe diſcoveries is the Art of extracting Printing and Writing Ink from Waſte Paper, whether in ſmall or large pieces, by obliterating the ink, and rendering the Paper perfectly white, *without injuring the texture* of the regenerated Paper, and of a quality as good as it originally was, for the purpoſes of writing and re-printing.

It is worthy of the directors of families to order their ſervants to ſave all the waſte White

White Paper, ſuch as letters and old writing-paper, which are generally thrown away or burnt, and regarded as of no conſequence; for, ſhould this be attended to, very conſiderable quantities would be collected, and large ſums of money ſaved, which are now expended in foreign countries for Rags; becauſe, if we calculate that Great Britain contains fifteen hundred thouſand families, and that half a ſheet of Paper ſhould be daily ſaved in every family, it would produce four thouſand four hundred tons,* which is about one-third of the quantity of Rags which have, of late, been converted annually into Paper in this country; whereby near two hundred thouſand pounds would annually remain in this country, which ſum is now ſent abroad for the purchaſe of Rags; and eighty-two thouſand one hundred and twenty-five pounds would be ſaved from

* A ream, or five hundred ſheets, being calculated at eighteen pounds weight.

fire

fire and deſtruction, calculating a pound of old Paper torn into pieces at two pence.

It has been imagined, that the preſent war has principally contributed to produce the ſcarcity of Paper-ſtuff, which, however, does not appear to be the ſole cauſe, becauſe the quantity of Rags uſed for making lint is very inconſiderable, compared to the enormous quantity at preſent uſed for the manufacture of Paper. Cartridges have uſually been made on the continent of old written Paper, which heretofore has been of no other uſe to Paper-makers than for the fabrication of paſte-boards.—It appears, from various conſiderations, that the ſcarcity has originated from the extenſion of learning, which occaſions much larger quantities of Paper for writing and printing; the large increaſe of newſpapers and monthly publications. Additional ſtationers, printers, and bookſellers, countenance this opinion.

opinion. More children are now every where taught to read and write; and the hand-bills of every deſcription, uſed for ſhopkeepers, plays, quackery, and other trades, require additional quantities of Paper. Paper-hanging, which is an invention of the middle of the ſeventeenth century, has, of late years, become more general; and few new-built houſes are finiſhed with walls, or wainſcot, as formerly, but the ſurface is every where decorated with painted or ſtained Paper, which is the moſt beautiful, the cleaneſt, and the cheapeſt ornament for furniſhing rooms.

I beg leave to obſerve, that little general knowledge, upon this uſeful ſubject, has been hitherto communicated to the public; I, therefore, will endeavour to give a brief hiſtorical account of the various methods and materials which have been uſed to convey ideas to poſterity, from the moſt ancient

ancient date to the period when the art of making Paper, from linen rags, was invented.

The art of writing, in itſelf, proves that mankind, at the time of its invention, muſt already have been in a certain degree civilized, and cannot therefore be very ancient; but the exact time when this art was diſcovered is impoſſible to be traced.

The invention of *letters*, and their various combinations, in the forming of words in any language, has ſomething ſo ingenious and *wonderful* in it, that moſt who have treated thereof, can hardly forbear attributing it to a *divine original*, and ſpeaking of it with ſuch a high admiration which is not far from a kind of rapture. Indeed, if we conſider of what vaſt, and even daily *ſervice* it is to mankind, it muſt be certainly allowed to be one of the *greateſt*, and moſt

ſurprizing

ſurprizing diſcoveries that ever was made in the world. No perſon can deny of what general uſe the art of writing is in commerce; in contracts of every kind; in preſerving, improving, and propagating learning and knowledge; in communicating our ſentiments to, and correſponding with our friends, with thoſe we love, or others, at any diſtance, whither letters can be conveyed. And by the means of writing, as the moſt valuable of all its advantages, we have a code of divine laws, uſeful hiſtory, indiſputable revelations, as a conſtant *directory* for our conduct, in our courſe through this probationary ſtate of life, to a happy eternity.

Notwithſtanding theſe great and manifold benefits, which men have all along received from this curious and wonderful invention, it is very remarkable, that writing, which gives ſome degree of *immor-*

tality

tality to almoſt all other things, ſhould be, by the diſpoſal of Divine Providence, ſo ordered, as to be careleſs in preſerving the memory of its firſt founders. No archives are preſerved, wherein the names of thoſe perſons are repoſited, that have deſerved ſo much of mankind, by inventing the *characters*, and *alphabets*, proper to expreſs their own language and thoughts! If we enquire only after our own country way of writing, who can tell us the names of thoſe ingenious men, that firſt found out the *alphabets* uſed in our offices of records, or indeed any hand in uſe amongſt us?

Some make objections to this boaſted *utility* of writing, and likewiſe to the new-diſcovered ſubſtitutes for Paper-ſtuff, by which the quantity of Paper, unavoidably neceſſary for writing, will be ſo greatly encreaſed. They alledge, that the

the *inconveniencies*, and *evils*,* that letters are the cauſes of, are equal to, if not more, than the *advantages* that ariſe therefrom. *Vicious* and *libertine* books, ſay they, are the laſting ſources of corruption in *faith* and *morals*. By the means of Paper and writing, falſe notions in religion, and even highly irritating hereſies are broached, and ſpeedily propagated; traitorous correſpondencies are held, and deceitful contrivances are carried on to the ruin of private families, and often to the deſtruction of happineſs in wedlock; and ſometimes to the ſubverſion of public adminiſtrations and government, which we

* *N. Tate*, Poet Laureat in Queen *Anne*'s time, wrote the following lines on the *good* and *evil* of writing.

View writing's art, that like a ſovereign Queen
Amongſt her ſubjects ſciences are ſeen;
As ſhe in dignity the reſt tranſcends,
So far her power of good and harm extends;
And ſtrange effects in both from her we find,
The *Pallas* and *Pandora* of mankind.

have

have in late years experienced in the major part of Europe.—It is certain that much miſchief has ariſen from Paper and Writing; and yet what is it but ſaying, that the pen is as dangerous an inſtrument in the world as the tongue? muſt we therefore renounce the uſe of the one, as well as the other? This would be a fanatical extreme, that all perſons of common ſenſe and common prudence will avoid and abhor: for it is evident, that it is not the proper uſe, but the abuſe of the art, that is objected againſt.

Lycurgus, a king of *Thrace*, obſerving the bad effects of wine amongſt ſuch of his ſubjects who drank it to exceſs, had all the vines in his kingdom cut down, and deſtroyed. Can any one applaud that king's contrivance, as a piece of wiſdom? or was it not rather a fooliſh and frantic act? The ſame muſt be applied to the above ſubject; for as there is hardly any one

one uſeful and good thing in the world but what may be perverted to bad purpoſes; ſo the abuſe of Paper and Writing is a poor argument againſt the general and great utility thereof. There have been ſome perſons like *Lycurgus*, of *Thrace*, of this erroneous way of reaſoning, with regard to letters; *Thamus*, an ancient *Egyptian* king, as is ſtated in *Plato's Phœdrus*, remonſtrated againſt the uſe thereof; as alſo againſt the reception of the uſeful parts of the mathematics, when *Theut* offered to introduce them amongſt his ſubjects. *Licinius*, a *Roman* emperor likewiſe, was a great enemy to letters, and uſed men of learning and philoſophers with outrageous cruelty, calling them *the bane and peſt of ſociety*. But theſe muſt be looked upon as the extravagant notions and whims of ignorant perſons who obſtinately glory to deviate from common ſenſe and the judgment of mankind; and therefore ought to be no further regarded,

than for their ſingularity, and the abſurd conſequences that attend them.

Another pretext againſt the uſe of Paper and Writing ſeems to be more plauſible than the former is, that it is an encouragement to a lazy diſpoſition. The objector ſays, if we truſt too much to books, or only write out what we ought to commit to our memories, we may in that be ſaid to lean to a broken ſtaff; and be apt to imagine ourſelves more learned and knowing than in reality we are. It is not the poſſeſſion of an extenſive and beautiful library with learned books that makes a man wiſe and learned; nor a ſuperficial manner of reading them over, or even making extracts from them, by way of a common *memorandum* book, that will enable us to ſpeak pertinently upon ſubjects, of which we wiſh to have the appearance to be maſters. Nothing but a fund in the memory, a large ſtock of good obſervations, and the

real

real *baſis* of knowledge, gained by diligence and experience carefully gathered and laid up there, can enable us to ſet up as traders in literature. Otherwiſe, we ſuppoſe ourſelves to be great ſcholars in the ſame manner as an empty, vain-glorious man, whom *Seneca* mentions, did: *(Calviſius Sabinus)*. As he was rich, he hired into his houſe ſeveral ſervants, that were well qualified in ſeveral ſorts of *learning;* and on *this ſtock* he ſet up for a perſon of *erudition;* ſo that he could reſolve by them almoſt any queſtion in the circle of literature that was ſtarted amongſt his viſitants.

Juſt ſo may be ſaid, that the relying on books, the product of writing on Paper, gives the mind a turn to an indolent habit; and takes it off from that induſtrious purſuit and attention, by which a mature knowledge of arts and ſciences are the moſt properly and ſurely gained. This objection muſt be allowed in its full force, but

nevertheleſs the knowledge of letters cannot be the real cauſe of ſuch indolence, or deficiency in the improvement of our natural powers and faculties. The noble inventions of Paper and writing can, therefore, by no means be accuſed of encouraging ſloth or negligence; but, if it be made a right uſe of, it is undeniably of ſpecial aſſiſtance to mankind in their literary purſuits and acquiſitions. For where is the memory, however well cultivated, that does not fail the owner ſometimes in particular circumſtances? and then to have recourſe to the ſubſidiary aid of writing on Paper, muſt be allowed to be of ſingular advantage. A perſon may ſometimes remember very well a quotation, or a ſtory, but may, even for the moment, not be able to recollect the author's name, which is often required to an illuſtration; is in ſuch inſtance a good library therefore not a beneficial reſource? Is here not fully proved the uſefulneſs of Paper and Writing?

ting? Let none, therefore, lay that blame upon the uſe thereof, which more juſtly belongs to their own wrong way of reaſoning; for it can no way encourage idleneſs, but rather opens and exhibits an ample field, in which the induſtrious may advantageouſly employ themſelves with honour and credit, if it be applied to the various good purpoſes for which it is moſt truly adapted.

Mr. *Robert More* gives a definition of writing in the following words: *Writing*, (ſays he, in his ſhort eſſay upon the invention thereof,) *is ſuch a repreſentation of our words, but more permanent, as our words are (or ought to be) of our thoughts.* He ſtates that the various combinations of twenty-four letters (and none of them repeated) will amount to

620,448,401,733,239,439,360,000.*

* Theſe figures are right; and I join here, for the uſe of thoſe who wiſh to be informed, the calculation,

Writing, in the moſt ancient language that

---

which is done by multiplying all the twenty-four figures one with another.

1
by 2

2
by 3

6
by 4

24
by 5

120
by 6

720
by 7

5040
by 8

40320
by 9

362880
by 10

3628800
by 11

39916800
by 12

479001600
by 13

6227020800
by 14

87178291200

that we know of, is called *Dikduk* דקדוק, which

87178291200
by 15

1307674368000
by 16

20922789888000
by 17

355687428096000
by 18

6402373705728000
by 19

121645100408832000
by 20

2432902008176640000
by 21

51090942171709440000
by 22

1124000727777607680000
by 23

25852016738884976640000
by 24

620,448,401,733,239,439,360,000

Clavius, the Jesuit, who also computed these combinations, makes the number to be but

5,852,616,738,497,664,000

which seems to be an error of the press, and that he calculates only 23 letters in his alphabet, and the misprinting appears only in a few figures

25,852,016,738,884,976,640,000

which it is ſaid ſignifies *a ſubtle invention;* and ſo it really is, and appears to be, if we do but reflect, as *Tully* obſerves in his *Tuſculan Queſtions*, that the *ſounds of the voice, which are in a manner infinite, are repreſented by a few marks or characters, which we call letters.* Theſe letters in Hebrew are called *Othioth,* אותיות, that is, *Signs;* being the ſigns, or repreſentations of our words, as is expreſſed in the foregoing definition.

But it may not be amiſs here to take notice, that it is not abſolutely neceſſary that there ſhould be juſt ſuch a preciſe number of letters, twenty-four, neither more or leſs, to expreſs all the words in a language. The alphabets of various languages ſhew the contrary. The *Hebrew, Samaritan,* and *Syriac,* have twenty-two; the *Arabic,* twenty-eight; the *Perſic,* and *Egyptian* or *Coptic,* thirty-two; the preſent *Ruſſian,* forty-one; the *Malabar,* fifty-one;

one; the *Japaneſe* have three alphabets, and forty-eight letters; the *Chineſe* have no alphabet, but uſe near eighty thouſand characters; the Greeks are ſuppoſed to have had but ſixteen letters at the firſt. But the ingenious *Wachter,* in his *Naturæ & Scripturæ Concordia,* has formed a ſcheme to ſhew, that ten characters, the number of our fingers, are ſufficient for the expreſſing of all words in all languages; as ten figures, 1, 2, 3, 4, 5, 6, 7, 8, 9, 0, are ſufficient to all calculations. As this invention of Mr. *Wachter* is at leaſt a curioſity, I have here inſerted it.

Conspectus Alphabeti Naturalis

Ex Wachteri Naturæ & Scripturæ Concordia, page 64.

Genus.	Figura.	Potestas.
Vocal		a, e, i, o, u.
Guttur		k, c, ch, q, g, h.
Lingual		l.
Lingual		d, t.
Lingual		r.
Dental		s.
Labial		b, p.
Labial		m.
Labial		f, ph, v, w.
Nasal		n.

The art of writing was for a long time entirely unknown in Germany, until the reign

reign of the Emperor *Charles the Great*, and made even very little progreſs for a number of years after his reign. Contracts and deeds were only regiſtered in very extraordinary caſes, and in general confided to the memory of authentic and reſpectable perſons; and in the preſent time, there is in no country written more than in Germany, which is proved by about one hundred thouſand new publications annually; which conſume a vaſt quantity of Paper.

Having ſhortly noticed the letters invented and adopted for writing and printing, and conveying ideas, ſentiments, and improvements in arts and ſciences from one to another, I will now give a brief account of the inſtruments and materials which have been made uſe of, before I proceed to a hiſtory of the materials which have been engraved, printed, and written on.

The

The inſtruments were of two kinds; they performed their ſervices either immediately or by the aſſiſtance of fluids. To the firſt belong the wedge, (*cuneus*); the chiſſel, (*celtes*, *celten*, *coellum*, *caelum*); and the writing feſcue, (*ſtilus*, *graphium*). And to the ſecond, the writing reed, (*calamus ſcriptorius*, or *calamus chartarius*); the pencil; and the quills or pens.

The wedge and the chiſſel are the moſt ancient writing inſtruments; the firſt inhabitants of the globe formed therewith in wood, ſtone, and on metal and wax, their images, or repreſentations, hieroglyphicks, and at laſt their alphabetical letters, which have been mentioned in the Bible in ſeveral places; (Job, ch. xix. v. 23, 24. Jeremiah, ch. xvii. v. 1.) On thoſe followed the writing-feſcue, which was uſually made from iron, and ſometimes from ivory, copper, ſilver, &c. Genteel perſons uſed in general feſcues

of

of ſilver, of which one has been found of Childerich. Thoſe of ivory or bone were uſed to write on wood and wax; and thoſe made of iron for writing on leaden and copper plates.

Theſe feſcues were of different ſhapes; ſometimes large and ſtrong, and ſmall and thin, for other purpoſes; ſome were of the ſhape of pins or needles; but one end was uſually blunt and broad, to efface the miſwritten letters and words, which were named by the Romans, *ſtilum vertere*. Some feſcues were ſo large, that they could be uſed for the ſame purpoſes as ſtilettos; and ſeveral authors have noticed, that in many inſtances they have been employed for committing murder. But it is doubtful, if this be the reaſon, why the uſe thereof has been entirely prohibited for ſome time in Rome. It would be a ſtrange interdiction; and as ſingular as a prohibition of cords and knives, be-

cauſe

cauſe they have been ſometimes employed for committing murder and ſuicide.

But ſuch feſcues were too ſharp for writing on parchment and Egyptian paper, for which reaſon reeds were employed for thoſe purpoſes. Pliny ſays, that the ancients gave the preference to Egyptian reed, (*cognatione quadam papyri.*) Yet many other reeds have been uſed; and Martinus Cruſius ſtates, that the writing reeds from Perſia were generally uſed. When ſuch reeds became blunt by uſe, they were either ſharpened with a knife, or on a rough ſtone, and ſuch re-pointed reed was named by Cicero *calamum temperatum.*

The reeds were ſplit on the points, like our pens, to lay the colour or ink neater on the paper or parchment, for which reaſon Auſonius names them *diſſipedes.* According to Chardin, the uſe of reeds is ſtill continued in ſeveral Oriental countries,

tries, and not ſuperceded by the introduction of quills. Goguet and others maintain that pencils have been uſed for writing prior to the introduction of reeds, but nothing can be poſitively aſcertained, except that reeds have been always more abundantly in uſe than pencils. The Chineſe continue ſtill to uſe hair-pencils for painting their letters. Their ink-ſtand is a poliſhed piece of marble, with a hole in one corner containing water, in which they dip a piece of ink, and rub it on the marble more or leſs, according as they wiſh to make the ſtrokes more black or brighter. They hold the pencil perpendicular, and write from the right to the left, from the top to the bottom. The marble, paper, pencil, and ink, which are all their writing inſtruments and materials, are jointly named *pau-tſe*.

Rauwolff tells us in his Travels, p. 87, (Augſburg, 1573,) that in the Turkiſh dominions,

dominions, in the ſhops, canes (for pens) are to be ſold, which are ſmall and hollow within, ſmooth without, and of a browniſh red colour, wherewith the Turks and Moors write: for to write with gooſe-quills is not in uſe with them. Tavernier alſo, in one of his voyages, p. 229, tells us, that the Perſians uſe three ſorts of hands: ſet-hand, court-hand, and running-hand; and that they write with ſmall Indian reeds, bearing their hands exceeding lightly. Their ink, he ſays, is made of galls and charcoal, pounded together with ſoot; but their paper is coarſe and brown, being made of cotton fuſtian. Sir John Chardin, in his Travels, vol. ii. p. 108, &c. likewiſe obſerves, that the Perſians, who write from the right hand to the left, hold their paper in their hands, and do not lean upon tables or deſks, as we do, and perform their work with dexterity. Worm, in his Muſeum, p. 164 and 383, tells us, that the inhabitants of Malacca write from the

the left hand to the right, as we do, upon the leaves of palm trees, ſome of which are two cubits long, two inches broad, and as thick as parchment; they make their letters, by pricking the leaf with an iron ſtyle, which they hold in their right hand, while the leaf is held in the left. The Turks in like manner, who employ a great number of clerks, as they permit no printing amongſt them, according to the aforeſaid Rauwolff's teſtimony, oftener write upon their knees than upon deſks or tables.

The introduction of quills, of which we make at preſent our writing pens, according to Iſidorus, Montfaucon, and Schwarz, is only one thouſand two or three hundred years ſince; and thoſe who ſay that it has been noticed by Juvenal are as erroneous as Chriſt, who, in his treatiſe on Literature and Antiquities, ſtates, p. 321, that pens made of quills are only two or

three hundred years in uſe. In the imperial library at Vienna is a picture, exhibited as a great curioſity, of Ariſtotle's writing with a quill; and in Rome is the ſtatue from which this picture is copied, with a manuſcript written in 1471. If that had been written in Ariſtotle's time, the ſtatue would have been moſt likely carved with a reed inſtead of a quill. Iſidorus Hiſpalenſis, who lived about the middle of the ſeventh century, is the firſt who uſed the word *penna* for a writing pen.

Let me here obſerve, that wherever the word pen occurs in our Engliſh tranſlation of the Old and New Teſtament, we muſt not underſtand it of a pen made of a quill, but of an iron ſtyle, or a reed; for though our name pen be derived from the Latin *penna*, yet this latter is never uſed for a pen to write with, in the Roman claſſics. Bayle, in his dictionary,

tionary, relates a remarkable particular of Leo Allatius, that he having made uſe of one and the ſame pen for forty years, in writing Greek, and loſing it at laſt, was ready to cry for grief; but he does not inform us what that pen was made of, nor whether he did not make uſe of ſome others between whiles. To give an inſtance nearer home of a ſimilar caſe, Philemon Holland, a phyſician of Coventry, tranſlated Pliny's Natural Hiſtory into Engliſh with one pen, as he ſays himſelf in theſe lines:

With one ſole pen, I wrote this book,
Made of a grey-gooſe quill;
A pen it was when I it took,
A pen I leave it ſtill.

The author of the Hiſtory of Manual Arts, 8vo. p. 61, ſays, that a lady, whoſe name he mentions not, preſerved this identical pen in a ſilver caſe; ſo that it poſſibly may remain in ſome muſeum of curioſities to this day.

In all ſtationery ſhops in this country are now exhibited for ſale various pens made of gold and ſilver, ſome of which are very uſeful, containing ink in ſuch a manner, that a perſon, by ſhaking it, is at all times able to write on promenades and travelling, or in libraries, picture galleries, naturaliſts cabinets, &c. which is much preferable to the writing with black-lead pencils, which rubs out and is obliterated. The mechanic Scheller in Leipſic makes a ſuperior kind. Nevertheleſs, pens made of gooſe-quills remain in common uſe, the conſumption of which is now very great in all countries, and are imported in many countries to a conſiderable amount. Is it, therefore, not ſurprizing that no greater attention is paid to breed geeſe more abundantly, as they provide not only pens to write with, but alſo feathers for our beds to repoſe easily, and wholeſome food for our ſupport?

In

In the library of the Duke of Brunſwick at Wolfenbuttle is an old Greek manuſcript of the four Evangeliſts, in which the pictures of St. Matthew and St. Mark are painted with beautiful colours on a gilt ground. All the ancient writing utenſils are here more diſtinct than in any other work. The ink-ſtand is therein of a black colour, and cloſe to it a veſſel which ſeems to contain a red liquid.

The ſand-box or glaſs was likewiſe a writing utenſil of the ancients. But they joined alſo another veſſel or glaſs, filled with a liquid, to attenuate the ink.

The feſcue and reed had always a ſeparate conſervatory, to prevent their being damaged, which was named by the Latins *theca calamaria*, and *graphiarium*. A puncher was uſually joined, which ſerved to point out the commencement and

end of each line, and ſometimes the large letters.

The rule, *regula*, *norma*, *canon*, was uſually a ſeparate utenſil, but ſometimes joined in the conſervatory. It was uſed to draw lines, and to divide the ſheets of parchment into *columns*. The lines were drawn with an inſtrument, ſimilar to a demi-circle, with a handle, and leaden or iron points. The ſame inſtrument, if of iron, ſerved likewiſe for cutting the parchment or paper. If it was too ſharp, it often cut the parchment. This inſtrument was named *ſubula*. Blank lines, drawn either with the feſcue or with the *ſubula*, are diſcovered in all neatly written ancient manuſcripts, and in many records from the ſixth to the fourteenth century. The pierced points diſcovered on both ends of the lines were made with the before mentioned puncher.

Pumice

Pumice (*pumex*) was likewiſe a writing material of the ancients, and uſed to ſmooth the rough and uneven parts of the parchment, or to ſharpen the reed. Pumice has been likewiſe uſed in modern times to eraſe ancient writings, to the deſtruction of valuable manuſcripts, which parchments were again ſmoothened, and often ſcribbled over inconſequent ſtuff, or of leſs note than it contained formerly, which is the origin of *codices reſcripti*. But if the ink had ſunk too much in the parchment, remnants of the old letters remained, as is to be ſeen in the library at Wolfenbuttle, where is preſerved an old piece of parchment, from which the Epiſtle to the Romans was eraſed, and the copyiſt had written the Origines of the Biſhop Iſidorus.

A ſponge ſerved to rub out ſuch letters as were written by miſtake or inattention on the parchment, and to wipe off or to

cleanſe the writing reed. Parchment or paper was cut either with paper-ſciſſars, or the before mentioned *ſubula*; and all lines were ſeparated at an equal diſtance with a compaſs.

The ink that the ancients wrote with, was of various kinds, in the compoſition and colours, as we have it now. Black, as at preſent, was the moſt common; for that reaſon the Latins called it, *melan*, *atramentum*. Dioſcorides, Pliny, Vitruvius, and Iſodorus have acquainted us with the different preparations of the ink which the ancients uſed, which are not at all ſimilar to the preſent. Pliny ſays, that the Romans made their ink of ſoot, taken from furnaces and baths. Some alſo wrote with the black liquid that is found in the *ſepia*, or cuttle-fiſh. Dalechamp, in a note upon the aforeſaid chapter of Pliny, obſerves, that the northern nations, (without explaining which he means by that term)

term) write very well with the ſaid liquid, by adding a little alum to it. Jacob Quandt deſcribes the ink of the ancient Hebrews, and in the Canaparius* publiſhed at Venice in 1619, are publiſhed a great number of receipts for making the ink of the ancients.

Perſius, the poet, in the following verſes, tranſlated by Mr. Dryden, humorouſly deſcribes a lazy young ſtudent, laying the blame of his own idleneſs upon his writing materials; where he metaphorically puts *sepia* for ink, and uſes three different words, in the compaſs of four lines, viz. calamus, arundo, and fiſtula, for a pen.

With much ado, his book before him laid,
And parchment with the ſmoother ſide diſplay'd;
He takes the papers, lays 'em down again,
And with unwilling fingers tries his pen;

Some

* This book is written in bad Latin, and deſcribes numerous chemical experiments, and was therefore re-publiſhed at London in 1660; and at Rotterdam in 1718.

Some peeviſh quarrel ſtraight he ſtrives to pick,
His quill writes double, or his ink's too thick;
Infuſe more water; now 'tis grown too thin,
It ſinks, nor can the characters be ſeen.

The firſt ink was made of red wine, concentrated by boiling, and of muſk named *ſapa*; ſince of mulberry juice; but principally of ſoot, tempered with ſome glue or gum, and ſometimes, for the preſervation of paper and parchment, with an extract from wormwood. The Chineſe make ink from lamp-black, obtained by burning different materials, principally of fir wood and oil, of which they make a paſte and dry it. All ink made of ſoot, changed in the courſe of time, its black colour into yellow, as appears by many ancient manuſcripts. But we muſt not form a decided opinion on the colour of ink with which manuſcripts have been written; becauſe we find, in almoſt all manuſcripts of the firſt fourteen centuries, letters of different colours, from the paleſt

to

to the darkeſt; and Wanſley juſtly obſerves, that amongſt ancient manuſcripts, of one thouſand years and upwards old, are found ſome written with ink yet darker black than any which we now are able to make. We cannot, therefore, reject the antiquity of a diploma, becauſe it reſembles our modern ink.

Our anceſtors uſed not only black ink, but alſo red ink of different ſhades and qualities, which was made of ruddle, *rubrica;* red lead, *minium;* the juice of kermes, *coccus*; or of vermilion, *cinnabaris;* and ſometimes purple ink, which was made, with a particular treatment, from boiled purple ſnails, and their pulverized ſhells.

Purple ink was very expenſive, and therefore not much uſed*. The writing therewith

* The knowledge of the ingredients uſed by the ancients in making purple was loſt with the conqueſt of

therewith became in later times a prerogative of the Emperors, that colour being a token of dignity, grandeur, and ſublimity. The oriental Emperors ſigned their edicts and mandates with purple ink, for which reaſon it was named *ſacrum encauſtum*; and as late as the twelfth century, they divided that honour with their next relations. The Emperor Leo interdicted the uſe of the *ſacrum encauſtum* to all private perſons and noblemen; and the regents who governed the ſtate, during the minority of an Emperor, uſed not purple, but green ink for their ſignature. Montfaucon notices ſome Imperial ſignatures with *ſacro encauſto*, which is greatly different

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of Conſtantinople, becauſe the purple-manufactures were, ſince the reign of Theodoſius, the great private property of the Emperors, and therefore there remained only one at Tyre, and another at Conſtantinople. The former place was deſtroyed by the Saracens and the other by the Turks; and thus this art, with which only a few perſons were acquainted, has been loſt, and not yet again diſcovered.

different from the *encauſtum* uſed by the Greeks and Romans for painting.

Joſephus ſays, the Jews had their *thora* with golden letters; and Hieronymus mentions that in his time has been written with gold; which yet is copiouſly done in Egypt, according to Maillet's deſcription of Egypt, vol. 2. p. 192. It is well known, that the Perſians, when they write to their ſuperiors, to whom they wiſh to ſhew in their letters high veneration, write on white paper with gold flowers; and they paint the name and title with gold letters.

The gold ink has been prepared different ways; the cuſtomary method has been, to mix pure gold and ſilver in a crucible over the fire, adding porphyrian marble and ſulphur, after it has been converted into fine powder, and digeſted over a ſlow fire in an earthen well-covered veſſel.

veſſel. The whole was then put into the ſame well-covered earthen veſſel, and kept on a ſlow fire until it was red. When cold, it was pounded in a marble mortar, with plenty of water; when ſettled, that water was poured off, and other water uſed until it was found thoroughly clean. If wanted for uſe, a part thereof was taken the day before, and ſome gum and water added, and, when uſed, made milk-warm.

Conſtantine the Great ordered fair-hand-writers to make fifty copies of the Bible on parchment, under the direction of the Biſhops Cæſarea and Euſebius, which have been ſince copied at different times with gold letters by command of his ſucceſſors.

At Hervorden is preſerved a manuſcript written with gold letters, found in the grave of Wittekind.

In

In the cathedral of Aix la Chapelle is a part of the New Teſtament written with golden letters. It was put into the grave of Charles the Great at the time of his burial, but the Emperor Otto the Third ordered it to be taken out in the year 1000, which was 186 years after the death of Charles. This book is remarkable becauſe the Emperors of the Roman empire were bound at their coronation to make their oath by laying their fingers on the firſt page of St. John the evangeliſt. It is in a large quarto ſize, and was elegantly bound 400 years after the death of Charles the Great, and is, with the cover, about three inches thick. The leaves are all of a violet-colour, and the gold colour of the letters is tolerably well preſerved. The book contains the writings of the four evangeliſts; but all that which belongs not to the text, is written with ſilver letters, and not ſo well preſerved. The whole

is very neat, but not divided into chapters and verſes; it is *in una ſerie*, without any ſtops, points, or other marks of diſtinction; without capital letters or ornaments: the letters are however all of one ſize, and the words without abbreviations. It ſeems to be written either at the latter end of the eighth, or the commencement of the ninth century. The ſeveral accounts given of this book are contradictory. Koehler erroneouſly aſſerts that it is written on bark-paper, but it is certain, and I am eye-witneſs by examination, that the leaves are thin parchment. If this book has not been taken away before Aix la Chapelle was Frenchified, I am at a loſs to know in what manner any future Emperor can be conſtitutionally crowned, becauſe, according to the conſtitution of Germany, ſeveral inſignia are required at the coronation of an Emperor, which are gathered together from ſeveral places, and brought ſolemnly

to

to Francfort on the Main for the uſe of the coronation.

Another book of the Evangeliſts with golden letters is in the convent of St. Emeran, at Regenſburgh: it is on one ſide with gilt plate, ornamented with diamonds; and given by the Emperor Arnolphus to the holy Emeran, before he died. It is publicly exhibited in the church of the convent on all holy days.

In the Imperial library at Vienna, and in the library of the convent of St. Gallen, are the Pſalms of David, written with golden letters. In the laſt century, there was, in the library of the Monkhouſe family, near Schaumbourg, the whole Bible written in golden letters, given to that family by Sophia the Firſt, Abbeſs of Ganderſheim, daughter of Otto the Second. And in the year 1788, Ettingen, a bookſeller of reputation at Gotha, offered for ſale

a very neat manuſcript, containing ſome chapters of the Alcoran, written with gold letters, in the Arabic language.

The following records are further preſerved. The diploma of Otto the Second, in the archive of the miniſter at Ganderſheim. A record of the Emperor Henry the Second, in the biſhopric of Paderborn in Weſtphalia. Another of Conrad the Third; and one of the Emperor Frederick the Firſt; both in the abbey of Corvey. And in the three confirmation bulls, of the privileges of the church of Rome, given by the Emperors Otto the Firſt and the Second, and Henry the Saint; and further, in the marriage compact of the Emperor Otto the Second with Theophania; and in the chart of Lotharius the Second, which he delivered to the Abbot Wiblo at Stavelot, the gold has not been ſpared.

In the vaults of a deſtroyed temple at Semipalat,

Semipalat*, in Siberia, have been found ſeveral rolls of blue and black coloured paper, entirely written on, with gold letters. They were delivered to the Czar Peter the Great, who could not diſcover in his empire one ſingle perſon who was able either to read or to tranſlate theſe neatly written and well-preſerved manuſcripts. One of theſe rolls was therefore ſent to Paris by Schumacher, librarian of the academy at Moſcow, to the Abbot Bignon, who was in great repute, and was librarian to the King of France, ſoliciting him to find out a learned perſon, who was able to ſtate in what language the roll had been written, and to develope the contents. The Abbot Bignon ſhewed it to Fourmont, interpreter to the king, who was ſaid to be maſter of the Chineſe and

* Semipalat, which is ſituated on the river Upper Irtiſch, ſtill retains its name, and that from ſeven palates, or apartments, which are there among the ruins.

and other oriental languages. This bold grammarian, who had never before ſeen ſimilar letters, and relying in full confidence on the fame of his great knowledge of the oriental languages, led by vanity, had the impudence to hold out, that he was the only perſon capable of tranſlating the writing. He aſſerted, it was written in the ancient Tangutian language, and delivered a fictitious tranſlation, compoſed by his own fancy. Peter the Great, who doubted the correctneſs of the tranſlation, nevertheleſs made him a very conſiderable preſent, and thereby encreaſed his fame. But in the reign of the Empreſs Ann, many years after the death of Peter the Great, two Ruſſians appeared at the academy of St. Peterſburgh, who, during a reſidence of ſixteen years in Pekin, had learned the Chineſe and Mantſchurian languages. They recognized immediately, that the writings of all the rolls were in the Mantchurian language; they read them

them without heſitation and difficulty; they tranſlated ſeveral, and amongſt others the roll, formerly tranſlated by the Frenchman Fourmont. But not a ſingle word agreed with his tranſlation; and it was fully aſcertained, that Fourmont had been an impoſtor, who did not know a ſingle letter of the roll. The original rolls are ſtill preſerved in the academy of ſciences at St. Peterſburgh, with both tranſlations; and are, according to Jacob von Stæhlein, permitted to be ſeen by every one who enquires for them.

Similar rolls of ſmoothed blue paper, written in part with golden, and in part with golden and ſilver letters, with the holy characters of the Tibetans, were in Sloane's library, and marked with the numbers 2836 and 2837. They were found beyond Siberia, in the ſouth-eaſtern part of Tartary.

Manuſcripts written with ſilver letters are more ſcarce. A few are yet exiſting. One of Gregorius Nazianzenus was in the King's library at Paris, wherein all quotations from the holy Scriptures were written with golden letters, and all other parts in ſilver. The Pſalter of David is in the library at Zurich, written with ſilver letters on purple-coloured parchment in the ſeventh century: the title is written with golden letters. The manuſcript of the Gothic tranſlation of the four books of the evangeliſts, by the Biſhop Ulphilas, who lived in the year 350, is preſerved at the univerſity of Upſal. All the letters are ſilver, except the capitals, which are gold. According to Mabillon and Gatterer, diplomas written with ſilver letters are not in exiſtence.

It is of conſequence to mankind in general that writings may be preſerved; which depends on the ſtrength of paper and

and parchment, and on ſuch a durable black ink, as will not fade by age, nor obliterate in water. Aſtle, in his Origin and Progreſs of Writing, ſays, "It is an "object of the utmoſt importance that "the records of parliament, the deciſions "and adjudications of the courts of juſ- "tice, conveyances from man to man, "wills, teſtaments, and other inſtruments, "which affect property, ſhould be written "with ink of ſuch durable quality, as "may beſt reſiſt the deſtructive power "of time and elements. The neceſſity "of paying greater attention to this matter "may be readily ſeen, by comparing the "rolls and records, which have been writ- "ten from the fifteenth century to the "end of the ſeventeenth, with the writings "we have remaining of various ages from "the fifth to the twelfth centuries. Not- "withſtanding the ſuperior antiquity of "the latter, they are in excellent pre- "ſervation; but we frequently find the

" former, though of modern date, ſo
" much defaced, that they are ſcarcely
" legible."

Several experienced chymiſts have endeavoured to diſcover a durable black ink, and to prepare paper for laſting writings; which induces me to acquaint the publick with their proceſſes. Lambert recommends " to pound the gall-nuts in an
" iron mortar to very fine powder, and
" to pour three or four times its quan-
" tity of water on it; to let it remain
" eight or ten days in the ſun, or to
" boil it for half an hour or longer, ac-
" cording to the quantity. To diſſolve
" iron-vitriol, to be ſtrained and added
" to the diſſolution of galls, till the ink
" attains the deſired black colour. Too
" ſmall a quantity of vitriol produces a
" brown reddiſh colour; if more be added,
" a violet; then a black hue, and at laſt
" a dark black. If the colour of the
" ink

" ink be not ſufficiently dark, he re-
" commends to thicken it by boiling, and
" then to add gum in ſuch a quantity
" that the ink may be neither too fluid
" nor too tough." The ink is always of a ſuperior quality, if made ſufficiently aqueous when prepared, becauſe by adding water a portion of the fine black particles will precipitate. Lambert defines not the quantity of the ingredients, and they are not always of the ſame quality. Lewis propoſes to take three ounces of galls to one ounce of iron-vitriol; but Lambert recommends to take leſs vitriol, to prevent the paper from turning yellow. Experience proves daily, that with one and the ſame ink written on different paper, different ſhades of black are produced; and this muſt originate in the lime and glue uſed in the paper-mill, or if the paper or rag has been bleached by a chymical proceſs. An ink which as far as it poſſibly can be done retains its dark colour

on

on every kind of paper, is the moſt preferable.

Auguſtus Lewis Pfannenſmith in Hanover has invented a black ink, which, by trial, is found to be ſuperior to all others: it is different from all other inks hitherto known, becauſe,

1. It is entirely made from ſuch productions of the country, as can be procured abundantly and cheap, without uſing galls and gum.

2. The writing done with this ink cannot be deſtroyed, by oil of vitriol, ſpirit of ſalt, ſpirit of nitre, ſalt of lemon, ſalt of ſorrel; nor by any alkalies, which can only alter its colour in a ſmall degree, either yellowiſh or reddiſh.

3. The writings with this ink alter not by time, or if expoſed to the air and heat of the ſun.

4. It

4. It can be prepared like the Chineſe ink in dry cakes, and is therefore convenient for exportation and travellers.

It's preparation is as follows: " One " peck of ſoot, and one and a half peck " of wood-aſhes, is to be boiled with four " or five pails of ſoft water, whereby the " alkaline ſalts extracted from the aſhes " diſſolve all thoſe parts of the ſoot " which are capable of diſſolution. This " is poured altogether into an empty " hogſhead, and filled up with water; it " muſt remain there for twenty-four " hours, conſtantly ſtirring the clear li- " quid, which is of a brown colour; it is " then drawn into another caſk of the " ſame ſize. About thirty or forty pounds " of oak bark, with four or five pounds " of Brazil wood ſhavings*, are to be " boiled during three or four hours with " as much water as is ſufficient to cover " the

* This wood is not abſolutely neceſſary.

" the ingredients. The extract is to be
" filtered through a cloth, and put into
" another veſſel. Six pounds of iron of
" vitriol is to be diſſolved in ſix pounds of
" ſoft water. To this diſſolution is to be
" added a pail full of cold water, and put
" into the caſk which contains the brown
" liquid. The alkaline ſalts extracted
" from the aſhes which were neceſſary
" to diſſolve the ſoot, and from the ex-
" tracted vitriolic acids, mix with the
" water; and the diſſolved parts of the
" ſoot, the iron and earthy parts of the
" vitriol, with the colour and gum ex-
" tracted from the oak bark, and Brazil
" wood ſhavings, form a mixed precipitate.
" It is therefore required to ſeparate the
" alkaline lie from the acid, which is
" accompliſhed by adding as much clean
" water as is required to fill the hogſhead.
" It muſt be well ſtirred, and left three
" or four days to ſettle, in which time
" the united precipitate is ſettled at the
" bottom.

" bottom. The clean water on the top
" muſt then be drawn off, and thrown
" away. The caſk is then to be filled
" again with freſh water, ſo far as to
" receive one pail full of water more. In
" the pail with water required to fill the
" caſk, twelve ounces of iron-vitriol is to
" be diſſolved, which is ſtirred and
" poured into the hogſhead. The laſt
" proceſs is neceſſary to facilitate the
" ſecond precipitation, which is otherwiſe
" more difficult than at the firſt time.
" Within two days it is again ſettled;
" the water is then to be drawn off from
" the top. A wooden frame muſt be pre-
" pared, on which is ſlackly to be faſtened
" a piece of half-bleached fine linen cloth;
" the frame muſt then be placed on ſup-
" porters as horizontally as poſſibly can
" be done, and a pail full of the preci-
" pitated colour is then ſlowly to be poured
" upon the ſtraining cloth. Some coloured
" liquid will at firſt run through, which

" muſt

" muſt be ſaved, but the clear water which
" comes afterwards is to be ſuffered to run
" away; then continue to add more of the
" precipitate, as much as the ſtrainer will
" hold, and only clear water will drain off.
" Within two or three days the colour
" appears on the cloth, reſembling pap,
" which is to be taken off, and well ſtirred
" with a few pails full of clean water in
" a wooden tub, and again poured into
" the hogſhead, which is again to be filled
" with clean water, and twelve ounces of
" iron-vitriol added in the ſame manner
" as heretofore deſcribed. The whole is
" then ſtirred, time is given to precipitate,
" and the colour ſtrained on the frame.
" The reaſon, why (throughout the whole
" of this proceſs) it is preſcribed to uſe re-
" peatedly ſuch a large quantity of water,
" is to clean the diſſolved ſoot as much as
" poſſible, and to obtain the united preci-
" pitate from the extract of the oak-bark
" and the iron-vitriol in the fineſt ſtate,

" which

" which principally contributes to the
" durability of this ink, and impreſſes
" deeper into the interſtices of the
" paper. The repeated adding and draw-
" ing off of the water is neceſſary to
" carry off the vitriolic acid as much as
" poſſibly can be done. Now, for the
" laſt time, take the ink-pap from the
" frame and add an alkaline-lie, prepared of
" two pounds or two pounds and an half of
" American pot aſh, diſſolved in the ſame
" weight of water, and ſix ounces of com-
" mon ſalt diſſolved in water, which is to
" be heated altogether in a boiler, con-
" ſtantly ſtirring it. If to this is added
" ſix quarts of malt-vinegar, well ſtirred,
" a very durable and good ink is obtained.
" The ſlimy parts of the vinegar are of
" uſe in this preparation. Should it happen
" that the ink prepared in this manner
" should turn out of a yellowiſh shade,
" the ſoot has been of too rich a colour,
" and there should have been taken leſs

" in

" in proportion to the colour extracted
" from the oak-bark. The laſt directed
" uſe of pot aſh, which in the firſt part
" of the proceſs has been preſcribed to
" detach, ſerves now to diſſolve again all
" the parts of the ſoot yet remaining in
" the mixed precipitate, and thereby to
" give the ink a greater power to impreſs
" into the paper; and to promote the
" durability of the colour, ſerving at the
" ſame time as gum. To form this ink
" into cakes, a number of flat ſtones
" ſhould be placed in ſuch a manner,
" that they may be eaſily heated. Some
" of the ink is to be poured thereupon;
" and when evaporated more is to be
" added, conſtantly ſtirring until formed
" like a paſte, which is to be taken from
" the ſtone plates, and laid on a warm
" place, till ſufficiently dried. If wanted
" for uſe the cakes are to be pulverized,
" and converted into good ink, by the addi-
" tion of ſome boiling water."

To

To prepare paper for laſting writings is a valuable addition in the art of making paper; and the new manufactory, now building at Millbank, for manufacturing paper from ſtraw and other vegetables, will be ſhortly in a ſtate to provide the publick ſufficiently with paper expreſsly manufactured for that purpoſe.

As perhaps the patience of the reader may be tired with the long but neceſſary proceſs of making an everlaſting black ink, I join for his recreation receipts for making the beſt and moſt laſting coloured inks.

For Red Ink:—Take four ounces pernambuco wood ſhavings of the beſt quality, boil it with half an ounce of alum in a quart of rain water, during one hour; when ſtrained, add a little gum Arabic.

In the ſame manner different coloured inks can be made from all known dyeing

woods. Yellow-wood will produce yellow ink; Brazil-wood, violet ink, &c. But all inks made from dyeing wood will be more beautiful and laſting, if a ſmall diſſolution of tin is added to it, which is to be prepared as follows: diſſolve in four ounces of the ſtrongeſt oil of vitriol, half an ounce of ſal armoniac, and as much tin as will diſſolve; or mix *ſpiritus ſalis* with *ſpiritus nitri*, and diſſolve in it as much tin ſhavings as will diſſolve, if it even ſhould take up two or three days, which ſolution, if kept in a glaſs phial, will laſt many years. All inks made from boiled dyeing wood may be mixed, and thereby obtain numerous ſhades of different beautiful colours: but care muſt be taken never to uſe in theſe inks a pen dipped in black ink, becauſe the particles of iron, which are a property of black ink, will ſpoil all other coloured inks.

For Green Ink:—Pound three ounces of verdigreaſe and two ounces of white tartar in ſixteen ounces of water for twelve or fifteen minutes; when ſtrained add two ounces of gum Arabic.

For Blue Ink of the greateſt beauty and durability:—Pound two ounces of the beſt Pruſſian blue (Berlin blue), and pour on it two ounces of ſpirit of ſalt, mixed with two ounces of water: keep it milk-warm, and ſtir it till the blue is diſſolved, which will take place in three or four hours. The veſſel muſt not be too ſmall, becauſe the mixture will at firſt ferment and riſe. It is afterwards attenuated with more or leſs water, according to the ſhade of blue you wiſh to have. No gum Arabic is to be added.

The diplomatics name, beſides metals, five other materials, uſed for the impreſſion of ſeals, and for ſealing letters and

other things, to wit, *terra ſigillata*, putty, paſte, wax, and ſealing-wax.

Notwithſtanding Pliny denies that ſeals have been uſed by the ancient Egyptians, it is nevertheleſs proved that they were well acquainted with the uſe of the *terra ſigillata*, which was, according to Herodotus, the firſt ſtuff employed for that purpoſe. He ſays, that the Egyptian prieſts bound on the horns of the animals ſelected for immolation, a piece of paper, on which they impreſſed their ſeals on *terra ſigillata*, and thoſe animals marked in that manner could only be taken for ſacrifices. Moſes mentions likewiſe the ſeal-ring of Pharaoh. Lucian ſays that all perſons who went to fortune-tellers, were obliged to write the queries on a ticket, which muſt be folded up and ſealed with wax or *terra ſigillata*. Cicero, Servius, and others ſay that the ſame has been uſed by the ancients; and it ſeems

that

that the ſame earth has been uſed for ſealing by the Byzantine Emperors, becauſe ſome perſon attempted to defend the worſhipping of images, by ſtating, that no perſon who received a command from the Emperor, and kiſſed the ſeal, did it to ſhew veneration to the parchment, the lead, or the *terra ſigillata,* but to ſhew his reſpect to the Emperor.

The earth which is now by us named chalk, cannot have been the *creta* of the ancients, which they uſed for ſealing, it muſt have been of the clay kind, which only takes impreſſions, and retains the ſame when hardened by drying. That the Latins have often expreſſed a kind of clay by the name of *creta* has been proved by Columella, Virgil, Varro and others.

Wax has been uſed for ſealing in the moſt ancient times in Europe; but whether

white or yellow was firſt uſed is a point on which the diplomatics differ. Gatterer ſays that the wax which was firſt uſed for ſealing was white, but Beckman declares that the yellow was the firſt and generally uſed, at leaſt by private perſons, being the cheapeſt; and I cannot help deciding in his favour, becauſe the progreſs of arts was very ſlow in ancient times, which induces me to believe that many years paſſed before the art of bleaching wax was diſcovered. After it was found out that the yellow colour of wax could be converted into white, it was ſoon coloured red; but green and yellow wax was not known in Germany before the fourteenth century.

That the Conſtantinopolitan patriarchs, the high-maſter of the Teutonic-order, the grand-maſter of the knights of Malta, and ſome of the firſt nobility, uſed the black colour for their ſeals, is, according to

to Gatterer, Thulemarius, Heineccius, and Hanſelman well known; but, that the maſters of the Templars uſed the ſame colour for ſealing, we are informed of ſolely by Dr. Chriſtopher Smith, otherwiſe Phiſeldek, who ſtates, that there is preſerved in the archives of the Duke of Brunſwic at Wolfenbuttle, a document, written by Maſter Widekind on parchment, on which hangs a black ſeal on blue and white linen thread.

Blue ſealing wax was unknown in former times, notwithſtanding it is ſtated by Struvius, that the Emperor Frederick the Third granted Hans Schenk, Lord at Tuutenberg; and by Heineccius, that the Emperor Charles the Fifth granted in 1524 Dr. Stockhammer in Nuremberg, the privilege to uſe blue wax for their ſeals. We may ſay, that the art of dyeing wax blue, is ſtill a ſecret. No receipt for making it is to be found in any ancient

work; and the receipts given by modern authors, by Le Pileur d'Apligny and others, produce no blue, but a dirty colour, which is neither green nor blue. The coloured juices, when united with wax, make it more greeniſh than blue; and if mineral-earths are uſed, they will not unite with wax, and ſettle at the bottom. If therefore a ſeal of blue wax could be produced, of which the external part has not been coloured, ſuch a curioſity would puzzle the technologiſts and diplomatics, and be a problem for our chymiſts. The privileges which have been given to Schenk and Stockhammer are therefore ſimilar to other privileges which have been granted in the year 1704 to the county of Reinſtein and the principality of Halberſtadt, not only to work in their mines minerals, but likewiſe indigo. By theſe privileges the Lord and Doctor could find as much blue wax, as the others could melt indigo from oar found

in

in their mines. Nevertheleſs, Beckman does not give up the hope, that the art of dying wax blue will yet be diſcovered, although all trials have hitherto been unſucceſsful.

The uſe of wafers is more modern than the uſe of ſeals; and no ancient diploma is to be found ſealed with wafers. The moſt ancient is not two hundred years old. Spieſz could not diſcover any one older than of the year 1624; but Martin Schwartner found, in the univerſity library at Peſt, three ſomewhat older; one is a paſſport, given by Father Viſitator to three travelling Jeſuits, dated Bruſſels 1603; the impreſſion on the wafers is the uſual inſcription on the Jeſuit ſeals.

Paſte has been uſed for ſealing letters before the diſcovery of ſealing-wax. Some learned men tell us of a ſeal-putty, named *maltha*, manufactured from combuſtible and

riſing

riſing compoſitions. If this aſſertion is founded on truth, it has been the firſt and moſt ancient ſealing-wax. The ſealing-wax now in uſe is compoſed of ſimilar materials, and has ſuperſeded all ancient ſealing matters by its cheapneſs, convenience, and beautiful appearance, notwithſtanding its brittleneſs, and that an impreſſion on it can be eaſily forged.

The moſt ancient mention of ſealing-wax in books is found in *Garcia ab orto aromatum & ſimplicium aliquot hiſtoria*, printed in 1563, where by gum-lac the ſticks for ſealing letters are noticed. In *Nouveau Traité de Diplom.* t. iv. p. 33, is ſtated, that Francis Rouſſeau, a Frenchman, was the inventor in 1640. It is ſaid that Rouſſeau, after many years reſidence in Perſia and India, returned to France, where he loſt all his property by fire, in the latter part of the reign of Lewis the Thirteenth, and then eſtabliſhed a manufactory for making

making ſealing-wax from gum-lac*, which he had learned in India. But this Frenchman is not intitled to the invention; which has been already uſed between the years 1550 and 1560, as can be proved by letters ſealed with black and red ſealing-wax preſerved ſince 1554 in the archives at Dillenburgh. Spieſz ſtates, that there is one on a diploma of 1563 in Anſpach; and Anton has ſeen in Goerlitz one of 1561 ſealed with red ſealing-wax; and another of 1620, with black ſealing-wax.

Tavernier

* The inſect which produces the gum-lac is a red ſhield-louſe, *coccus lacca*, not yet deſcribed in any natural hiſtory known to me. It ſticks faſt to the branches of the *ticus religioſa; indica, rhamnus jujuba, plaſo hort. malab.*, and ſoon appears on the edge of the body a demi-tranſparent glue-like humidity, which ſhortly forms a complete cell. Theſe cells are the gum-lac. The white ſubſtances which are found in the empty cells are the ſtriped hides of the young inſects. It is plentiful on both ſhores of the river Ganges; and one hundred weight has formerly been ſold at Dacca for twelve pounds. The moſt preferred is dark red. The inhabitants of theſe countries make rings and beads of gum-lac, which they gild and paint, to ornament the fingers and arms of their wives.

Tavernier mentions the preparation of ſealing-wax in the Eaſt Indies; and it is probable that the Portugueſe learned the art of making ſealing-wax in the oriental countries. Its firſt name has been Spaniſh wax, and the French ſtill call it *cire d'Eſpagne*; and it ſeems that it got the name of ſealing-wax ſince gum-lac has been uſed in place of common roſin. Without gum-lac no ſealing-wax can ſtick to well-ſized and glazed paper.

Copyiſts, illuminators, and book-painters, had full employ before the art of printing was invented; but ſo much has been written and printed on this, that it would be uſeleſs to notice it in this work; and there are ſo many nominations of the ancient writers, that the ſtatement of it alone would fill a book. Whoever wiſhes to be convinced of this, has only to examine Hermanus Hugo *de prima ſcribendi origine*, and the Brunſwic Notices of 1750;

and

and for modern times, full information is to be obtained from Maſſey's Origin and Progreſs of Letters. I ſhall therefore only notice the names given to the principal writers.

All copyiſts were named by the Romans *librarii*, and ſometimes *ſcribis*. *Bibliopolae* were perſons who kept a number of ſervants to write down their own works and dictations, and copied the works of others. *Calligraphi* were fair hand writers. *Tachygraphi*, quick hand writers, and ſometimes ſhort hand writers; they were likewiſe named *exceptores*. Secret writings were deſcribed by *kryptographi* or *ſteganographi*. The Turks call ſecret writings *ſelam*. Monks replaced afterwards the *librariorum*. Remarks written on the edges of manuſcripts were called *gloſſemata*. *Examinantes* were perſons who overlooked the works of the copyiſts, to which they ſigned their names. The art of printing here ſhews its

its great ſuperiority, becauſe all copies are the ſame as the firſt. *Illuminatores* painted ſome letters and other ornaments of books.

Of the noble invention of printing*, I likewiſe paſs, and continue with making ſome few obſervations on books and book-binding, and on their being ſo much expoſed to be deſtroyed by moths and worms.

The ancients, according to Pliny, uſed to preſerve their parchment, paper, and books from moths, by waſhing them over with cedar or citron oil, which gave them at the ſame time an agreeable ſcent. Theſe books were named *libri cedrati* or *citrati*. He believes that the preſervation of

* It is ſurpriſing that the art of printing books was not earlier invented, as it is well known that the Romans were in the habit of ſtamping the initials of their names on the bread which they ſent to the publick ovens for baking, which is certainly a kind of printing.

of the books found in the grave of Numa was ſolely attributed to this precaution. In modern times, many preſervatives for books againſt deſtructive inſects have been propoſed, but none have yet been effective. The Royal Society of Sciences at Gottingen thought it therefore of ſufficient conſequence to propoſe in their aſſembly at the 10th July, 1773, a premium for July 1774, to be given him who delivered the beſt anſwer to the following queſtion: How many kind of inſects are found which are detrimental to records and books? which of the materials, as pap, glue, leather, wood, thread, paper, &c. were attacked by each kind? and, which is the beſt and moſt approved remedy, either to preſerve records and books againſt inſects, or to deſtroy the inſects?

Among the numerous anſwers received, Dr. Herman of Straſburgh obtained the premium, and Flad of Heidelbergh got the

the *acceſſit.* I will give an abridged extract of their anſwers. Many inſects are charged with injuring books without doing miſchief, ſuch are: *acarus, cimex perſonatus, lepiſma ſaccharina, tinea veſtianella, tinea pellionella, tinea ſarcitella, attelabus mollis, attelabus formicarius,* and *attelabus apiarius;* of the following it is not yet fully aſcertained if they are guilty or innocent; 1. *termes pulſatorium* named alſo *the ſmall pumice, the timberſow, the book-louſe,* and *the paper-louſe;* 2. *phalangium cancroides;* 3. *blatta orientalis;* 4. *ptinus fur;* 5. *tenebrio molitor;* and 6. *phalaena, or tenia granella.* The truly deſtructive inſects are, *ptinus pertinax, dermeſtes paniceus, dermeſtes lardarius, dermeſtes pellio,* and *byrrhus muſaeorum.* To preſerve the records and books againſt inſects and to deſtroy them, it is propoſed 1. to aboliſh the binding books with any wood; 2. to recommend the bookbinder to uſe glue mixed with alum in place of paſte; 3. to bruſh all worm-

eaten

eaten wood in the repoſitories of books with oil or lac-varniſh; 4. to preſerve books bound in calf, he recommends to bruſh them over with thin lac-varniſh; 5. no book to lay flat; 6. paper, letters, documents, &c. may be preſerved in drawers without any danger, provided the wafers are cut out, and that no paſte, &c. is between them; 7. the bookbinder is not to uſe any woollen cloth, and to wax the thread; 8. to air and duſt the books often; 9. to uſe laths, ſeparated one from the other one inch, in place of ſhelves; 10. to bruſh over the inſides of book-caſes and the laths with lac-varniſh.

The paper in North America is ſpeedily deſtroyed by dampneſs and inſects, which, on the ſuggeſtion of an honorary member, Mr. François at Neufchatel, induced the Society of Sciences at Philadelphia, in their Aſſembly of the 11th May 1785 to offer a premium for the beſt anſwer

on the queſtion: if there was no effectual remedy to protect paper againſt inſects? This ſociety offered another premium of twenty-five moidores for the beſt method of making paper for St. Domingo, which would reſiſt inſects, and requeſted to have ſamples to prove its quality. Several anſwers and ſamples were received, but all recommended to mix the ſize, on ſizing, with ſharp and bitter, or other ingredients which might kill the inſects, to wit, vinegar, allum, vitriol, ſalt, turpentine, extract of aloes, tobacco, or wormwood; camphor, aſafœtida caſtoreum, and arſenic, either to be uſed in the ſize, or afterwards impregnated by infuſion. But theſe remedies were all rejected, and conſidered to be either inſufficient, or pernicious and dangerous; for which reaſon, the ſociety renewed their offer, without limiting their anſwer to a preciſe time, but without any ſatisfaction, except that Mr. Arthaud, Royal Phyſician at Cape François, named

the

the insects which were the most destructive to paper in these countries: *dermestes scutellatus, nigro testaceus, ovatus, glaber, clytris thorace punctis impressis, oculis nigris punctatis, antennis curvatis, apice articulis tribus perfoliatis compressis,* which generates in all seasons during the whole year, and is considered as the most dangerous of all paper-eaters.

To prepare paper for preservation against insects, is likewise an object to which some of the proprietors of the new manufactory now building at Millbank have paid particular attention; and they flatter themselves they will likewise be able to bring to sale, and to lay before the examination of scientific men, and the publick at large, paper, in this view much superior to any other heretofore manufactured.

Paper is likewise used for filtring; and

that now employed for that purpoſe is the common blotting paper, which is very tender, the publick are therefore herewith informed that this inconvenience is likewiſe remedied, and at the Neckinger-mill is now manufacturing a paper, ſuperior to any other, in ſtrength and durability, for the purpoſe of filtring, and ſold by the bundle, or two reams, for a moderate price; which paper has been examined, tried, and approved of by Dr. Crichton and other experienced chymiſts.

I finiſh now theſe accounts and obſervations which I thought proper to add to this work, and I proceed with the hiſtorical account of the ſubſtances which have been uſed to deſcribe events, and to convey ideas, from the earlieſt date to the invention of paper.

In the moſt ancient time, when writing was not yet diſcovered, very ſimple means were

were uſed to preſerve the remembrance of important events. Tradition repreſented, therefore, during many centuries, what now is more completely effected by writing and printing. Trees were planted, heaps of ſtone, or unornamented altars and pillars, were erected, plays and feſtivals were ordered, and ſongs ſung to keep up the recollection of paſt facts. The ſacred hiſtory mentions, that the Patriarchs erected altars or heaps of ſtones as remembrances of paſt events.

Rough ſtones and ſtakes were the firſt reminding letters of the Phœnicians. In the environs of Cadiz, ſeveral heaps of ſtones have been found; monuments of Hercules's expedition againſt Spain. The ancient inhabitants of the North placed, in different ſituations, ſtones of an extraordinary large ſize, to remember great events. And we have found, in modern times, that the ſavages in America do the ſame; and

ſome place bows on the tombs of men, and mortars with peſtles on the tombs of women. It has been likewiſe a cuſtom to give names to certain places, and their environs, which referred to the tranſactions and deeds which there took place.

Since the art of writing was invented, ſeveral materials have been uſed, on which was engraved or written what was wiſhed to be conveyed to poſterity. But nothing poſitive can be aſcertained with reſpect to the different materials employed by the ancients for that purpoſe, except that a diſtinction has been made between public records and private writings. For the firſt; ſtones, timber, and metals, were chiefly uſed; and, for the latter, leaves and bark of trees. The Egyptians, the inhabitants of the Northern countries, and ſeveral others, made uſe of ſtones, rocks, and pillars, for that purpoſe.

Job mentions rocks as the materials uſed in his time; and the Danes engraved likewiſe upon rocks the deeds of their anceſtors.

Joſephus has related, that the children of Seth had, before the deluge, erected two pillars, and thereupon engraved their inventions and aſtronomical diſcoveries, the one of which was of ſtone, and the other of brick-clay, becauſe they had heard, from their grandfather, Adam, that the world would be deſtroyed once by fire, and once by water; and, to prevent their knowledge of the motion of planets, &c. being loſt to poſterity, they had engraved it on the before-mentioned pillars, the one of which could not be deſtroyed by water, nor the other by fire; and the ſame author ſtates, that the ſame pillar of ſtone exiſted ſtill, in his time, in the country of Siriad. But where that country was ſituated is very difficult to aſcertain; ſome ſay in Syria. Marſham, Voſz, and others,

aſſert it to be *Seirath,* mentioned in the Scripture, (*Judges*, chap. iii. ver. 26); the moſt likely ſuppoſition ſeems to be, according to Dodwell, Stillingfleet, and Fabricius, that it was ſituated in Egypt.

Theſe pillars bring into recollection others more celebrated, erected by Bacchus, Hercules, Oſiris, and Seſoſtris, to commemorate their exploits. But the moſt famous were the pillars of Mercury Triſmegiſtus, on which his doctrines and rules were engraved with hieroglyphic characters. Porphyrius mentions ſome pillars in the Iſland of Crete, on which the ſacrificial ſervice of Cybeles, and the religious rites were engraved; and, at the time of Demoſthenes, there was ſtill a column of ſtone exiſting, on which the code of laws was engraved. Numerous other pillars could be mentioned, but it is ſufficiently aſcertained, that the moſt ancient nations were not acquainted with any other method

thod of keeping in remembrance their code of laws, acts and contracts, the hiſtory of events, and important diſcoveries; and theſe public records have been the ſources of knowledge of the ancient authors.

It was likewiſe a cuſtom to write on bricks, and ſtone plates, principally to immortalize laws, inſtitutions, and important events.

The Babylonians, according to Pliny, wrote their firſt aſtronomical obſervations on bricks, and the Oſtraciſm* of the Athenians

* The *Oſtraciſm* was invented by the Athenians when they became jealous of Ariſtides, who at firſt was loved and reſpected, and received for his ſurname *the Juſt*. But elevated with victories, they thought themſelves capable of every thing, and were uneaſy to ſee a fellow-citizen raiſed to ſuch extraordinary honour and diſtinction; they aſſembled at Athens from all towns in Attica, and baniſhed Ariſtides by the Oſtraciſm; diſguiſing their envy of his character under

nians was ſometimes inſcribed on oiſter-

ſhells,

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under the ſpecious pretence of guarding againſt tyranny. The Oſtraciſm was conducted in the following manner: every citizen took a piece of a broken pot, or a ſhell, on which he wrote the name of the perſon he wanted to have baniſhed, and carried it to a part of the market-place that was encloſed with wooden rails; the magiſtrates then counted the number of the ſhells, and pieces of broken pots; and if it did not amount to ſix thouſand, the Oſtraciſm ſtood for nothing; if it did, they ſorted them, and the perſon whoſe name was found on the greateſt number, was declared an exile for ten years, but with permiſſion to enjoy his eſtate.

At the time that Ariſtides was baniſhed, when the people were inſcribing the names on the ſhells, and pieces of broken pots, it is reported that an illiterate burgher came to Ariſtides, whom he took for ſome ordinary perſon, and giving him his ſhell, deſired him to write Ariſtides upon it. The good man, ſurpriſed at the adventure, aſked him "Whether Ariſtides had ever "injured him?" "No," ſaid he; "nor do I even "know him; but it vexes me to hear him conſtantly "praiſed, and every where called *the Juſt.*" Ariſtides made no anſwer, but took the ſhell; and having written his own name upon it, returned it to the man. Thus was the man rewarded who was the deliverer of Athens, and had by uprightneſs and juſtice ſo greatly contributed to its happineſs. When he quitted Athens, he lifted up his hands towards heaven, and, agreeably to his character, made a prayer different from that of

Achilles,

ſhells, and in general on the fragments of broken pots.

The moſt ancient monuments of Chineſe knowledge were engraved on hard and large ſtones. The ten commandments were written on ſtone or marble plates; which ſeems more likely than as is ſuppoſed by ſome fanciful writers, who, to dignify thoſe tables, hold out, that they were made of precious ſtones, rubies, carbuncles, or amethyſts; but as nothing of this appears in the ſacred original, it is more probable that they were of ſuch ſtones

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Achilles, namely, "That the people of Athens might "never ſee the day which ſhould force them to remem- "ber Ariſtides." Three years after, the Athenians reverſed this decree, and by a public ordinance recalled all the exiles. The principal inducement was their fear of Ariſtides; for they were apprehenſive that he might join the enemy, corrupt great part of the citizens, and draw them over to the intereſt of the enemy. But they little knew the worthy man; for, before this ordinance of theirs, he had been exciting and encouraging the Greeks to defend their liberty.

ſtones as were found at the ſpot, which might be moſt likely marble, being abundant in Egypt, and which were hewn, and poliſhed, by the hand, or direction of Moſes. Joſhua wrote the other laws on plates of the ſame kind, and the names of the twelve Jewiſh tribes were carved on precious ſtones on the ephod of the high prieſt. The inſcriptions on Mount Sinai, and the ſurrounding mountains, ought to be noticed here, if their antiquity could be aſcertained. The hieroglyphics of the Egyptians, who boaſted to be the moſt ancient of all nations, are chiefly found on obeliſks, ſtone pillars, &c. and the decrees of Lycurgus were carved in ſtone. A very ancient Grecian ſuperſcription on ſtone is exiſting on the weſt borders of Aſia Minor, where the Mitylenians have built the city of Sigium, from the gathered ſtones of the city of Troy. This city was deſtroyed long ago by the Ilienſians; the ſtone ſtill lies in the village of

Ieni-

Ieni-Hiſſary, called, by the Turks, Gaurkioi, before the porch of the Greek church, and is uſed for a ſeat. The inſcription on this ſtone is now upwards of 2360 years old. William Sherard, Eſq. Britiſh Conſul at Smyrna, took the firſt copy of it; and Samuel Liſle, preacher to the Engliſh reſiding at Smyrna, copied it carefully, and it was afterwards engraved and printed in London, on nine ſheets, by his Majeſty's chaplain, Edmund Chiſhull, with explanations, in the year 1721. Still more ancient inſcriptions at Amyclae, have been diſcovered, and publiſhed by Fourmont and Barthemely. They are written in the ſame manner as thoſe of Sigeum, reſembling plough-furrows, but they go from the right to the left, and were preſerved in the Royal Cabinet, at Paris. Numerous other ancient inſcriptions on ſtone are found commemorated in Carſten Niebuhr's Travels in Arabia. The convention of the Smyrnans and Magneſians was

engraved

engraved on marble 270 years before the birth of Chriſt, and the *Jus Publicum* of the Athenians was engraved on triangular ſtones named Cyrbes. Numerous old inſcriptions in the Etruſcan, Greek, and Latin languages, on ſtone and marble, on plates, urns, vaſes, and ſarcophagi, are ſtill preſerved in the firſt and ſeventh room of the gallery of the Grand Duke of Tuſcany at Florence; and in the firſt room of that gallery are ſeveral inſcriptions on burnt clay, with which the Etruſcans covered the unburnt bodies of their deceaſed friends. The Latin incriptions are divided into twelve claſſes. The firſt thereof commences with the gods, and their prieſts. In each of them are preſerved ſome of thoſe which have been brought from Africa by Pagni, deſcribed by Gori, Falconieri, and Spon; they are diſtinguiſhed by the Greek λ which is uſed in the place of the Latin I. The ſecond claſs relates to the Emperors, and contains amongſt others the ſo much admired

admired baſes by Maffei, and a large epiſtylium which is faſtened in the wall above the principal door. It was found with four others at Civita Vecchia in a dark repoſitory belonging to monuments ſacred to Tiberius and Livia. It is worth the notice of antiquarians, that on this marble after the name of Tiberius ſome of the inſcription has been eraſed, and replaced with the words DIVAE AUGUSTAE, which may be occaſioned by Claudius's adoration of Livia. The third claſs refers to the conſuls and other Romans of rank. The fourth, to the Roman municipalities, to which have been added a great many, new and beautiful. The fifth, for the publick buildings and plays in which the mile-pillars are inincluded. The ſixth, for the military. The ſeventh, and eighth, contain the titles given by ſurviving relations to their deceaſed anceſtors. The ninth, relates to ſlaves who got their freedom. The tenth contains monuments of chriſtianity.

The

The eleventh, ſuch inſcriptions of only the names of deceaſed perſons. And the twelfth is a mixture of different inſcriptions, amongſt whom many are doubtful and ſeem to be counterfeited. But Maffei in his *Arte critica lapidaria*, recommends notwithſtanding the preſervation of theſe inſcriptions, becauſe they may ſerve for publick information, and principally, that at one time or the other it may be proved, they are genuine, as has been the caſe with the inſcription of Scipio Barbatus, and ſeveral others in the collection of Riccardi, which were declared by Maffei, to be counterfeit. But notwithſtanding ſeveral of them have been proved to be counterfeit, by the colour of the marble, the moſt part are genuine, which ſatisfactorily proves the art of writing was known to the ancients.

But theſe materials were ſoon found to be difficult to write upon, and therefore others, more ſimple and more convenient, were

were ſought for. Bricks and ſtones were changed for different kinds of metals, and lead became then the moſt ancient writing ſubſtance. Job mentions, in chapter xix. verſe 24, engravings with an iron pen on lead; and Pauſanias ſays, that Heſiod's *Opera et Dies* was written on leaden tables, which were preſerved on the mountain of Helicon. Pliny ſtates, that lead was uſed for writing, which was rolled up like a cylinder. Hirtius wrote to Decius Brutus on leaden tables. In Italy were preſerved two documents of Pope Leo III. and Luitbrand, King of the Longobards; and, according to Kircher's Muſeum, table X. many more of ſuch writings on lead are to be found. For example, Montfaucon notices a very ancient book of eight leaden leaves, the firſt and laſt was uſed as a cover, and that it contains numerous myſterious figures of the Baſilidians, and words partly Greek, and partly of Etruſcan letters. On the back were rings faſtened, by

means of a ſmall leaden rod, to keep them together. Pauſanias notices likewiſe, in his Meſſenica, that Epiteles dug up out of the earth a braſs veſſel, or urn, which he carried to Epaminondas, (about 350 or 360 years before the birth of Chriſt,) in which there was a fine plate of lead or tin, rolled up in the form of a book, on which were written the rites and ceremonies of the great goddeſſes. And we have a late diſcovery of writing on lead, if the account given in the Gentleman's Magazine, July 1757, may be depended on; it is no longer ago than in the year 304. "In a ſtone cheſt, the acts of the council of Illiberis, held anno 304, were found at Granada in Spain; they are written or engraved on plates of lead, in Gothic characters, and are now tranſlating into Spaniſh."

Bronze was afterwards more frequently uſed than lead, as is certified in the Hiſtory

tory of the Maccabees, by Dionyſius of Halicarnaſſus, Cicero, Livy, Pliny, Suetonius, and Julius Obſequens. Phœnician letters were on the kettle of bronze, devoted by Cadmus to Minerva, who was adored at Lindus, on the iſland of Rhodes. But, as the kettle is not only loſt, and the copies of the inſcription, with thoſe of Cadmiſian letters, on ſeveral tripod veſſels, mentioned by Herodotus, and others, I ſhall confine myſelf to thoſe which ſtill exiſt, of which the moſt remarkable are the famous *Scriptum de Bachanalibus,* in the Imperial Library; Trajan's *Tabula Alimentaria;* and the helmet, found at Cannae, with Punic letters, deſcribed in the *Muſeo Etruſco* of Gori, and which is now in the third room of the gallery of the Grand Duke of Tuſcany, at Florence. I cannot omit noticing the eight tables of bronze, found in the town of Gubbio, in a ſubterraneous cabinet, when, in the year 1444, parts of an amphitheatre were removed: on ſeven tables the

inſcriptions were in the Latin, and one in the Etruſcan language. Since that time ſeveral bronze tables, with Etruſcan writing, have been dug up in Tuſcany. The ſeven Latin have been deſcribed and engraved on copper-plates, by Mérula, Gruter, and others, and one by Thomas Demſter.

The criminal, civil, and ceremonial laws of the Greeks have been engraved on bronze tables, and the ſpeech of Claudius, engraved on plates of bronze, are yet preſerved at the town-hall of Lyons, in France.

The celebrated ſtatutes or laws on twelve tables, the major part of which the Romans copied from the Grecian code, were firſt written on tables of oak, but according to others on ten ivory tables, and hung up *pro roſtris*. But, after they had been approved by the people, they were engraved in bronze. But theſe were melted through fire occaſioned by lightning which

ſtruck

ſtruck the capitolium, and conſumed likewiſe numerous other laws for the cities and country, which were there depoſited; the loſs thereof was highly regretted by the Emperor Octavius Auguſtus. The laws of the Cretans were likewiſe engraved in bronze; and the Romans etched, in general, their code *plebiſcita*, contracts, conventions, and public records, in braſs, not only during the exiſtence of the republic, but likewiſe under the reign of the Emperors. The magiſtrates of Athens were choſen by lot; the names of the candidates were written on bronze plates, and put into an urn, with white and black beans, and the perſon whoſe name was taken out with a white bean was elected.

The pacts between the Romans, Spartans, and the Jews, were written on braſs, which method was likewiſe obſerved by the guilds and private perſons who uſually, for ſecurity, got the land-marks of their eſtates

engraved on metal; and in many cabinets are yet to be ſeen the diſcharges of ſoldiers written on copper-plates. It is not long ſince, at Mongheer, in Bengal, a copper-plate was dug up, on which characters of Schanſcreet were etched ſignifying a gift of land, from Bideram Gunt Raja of Bengal, to one of his ſubjects. This bill of feoffment, on copper, is dated 100 years before the birth of Chriſt, and proves at the ſame time that the Indians were, about two thouſand years ago, in a high degree of cultivation. Such genuine documents, written on ſuch hard ſubſtances, in more modern times are very ſcarce. The Archbiſhop Adelbert, of Mentz, ordered a grant to be engraved on metal plates, which privilege is kept over the door-wings of the church *B. Mariæ Virginis ad gradus,* in Mentz; and, in 1011, theſe door-wings were manufactured of caſt metal, reſembling bronze, by the Archbiſhop Willigis.

The

The Abbot Cabent, and the Benedictine Monk Legipont, entertain the opinion, that the moſt ancient writing material which has been uſed was wood. It is certain that box-wood, deals, and ivory tables, have in thoſe times been occaſionally made uſe of to write upon, but of the preciſe time nothing can be aſcertained with certainty.

Iſaiah (chapter xxx. verſe 8), and Habakkuk (chapter ii. verſe 2), make mention of writings upon tables, that it may be remembered for the time to come, for ever and ever.* Solon's Civil Laws were written on boards, which were placed in a machine,

* Solomon, in the Book of Proverbs, (chap. iii. ver. 3.) in alluſion to this way of writing on thin ſlices of wood, adviſes his ſon, to *write his precepts upon the table of his heart.* Solomon lived about one thouſand years before the birth of Chriſt, and Habakkuk near four hundred years later; between which two different periods, different authors place the birth of Homer. This proves, that the *pugillares*, or tables of wood to write on, were in uſe before Homer's time, but how long before, no authentic account can be obtained.

a machine, conſtructed to turn them eaſily, called *axones;* and, even in the fourth century, the laws of the Emperors were publiſhed on wooden tables, painted with ceruſe, which gave riſe to the expreſſion in Horace: *Leges incidere ligno.* The Swedes had the ſame cuſtom, for which reaſon the laws are ſtill by them named, *Balkar,* originating from a piece of timber, called *Balkan,* which is a balk or beam.

The Greeks and Romans uſed commonly, at an early period, either plain wooden boards or covered with wax. The Greeks called wooden boards which were not covered with wax, *Schedæ* or *Schedulæ.* On ſuch *Schedulas* was written, in the Hebrew language, the Goſpel of Matthew, which, according to Baronius, in his *Martyrologium Romanum,* was found in the tomb of the Apoſtle Barnabas. The name of *pugillares* given by the ancient Romans, originates from *pugillum,* becauſe they could

could be held in one hand; theſe tablets alſo were ſometimes called *codices* and *codicilli*; from *caudes*, the trunk of a tree, being cut into thin ſlices, and finely planed, and poliſhed; and they uſually conſiſted of two, three, five, and ſometimes of more leaves; from whence they were more diſtinguiſhingly denominated by the Greeks *diptycha*, *triptycha*, and *pentaptycha*; and thoſe leaves, being waxed over, or overlaid with wax, were named *Pugillaris cerei*, and were written upon, with an inſtrument called a ſtile. Yet it is very probable, that thoſe tablets, being only thin ſlices of wood, having a ſmooth ſurface, were at firſt written upon juſt as they were planed; and that the overlaying them with wax, was an improvement of that invention. Perſons who would privately correſpond, or give ſecret intelligence to others, wrote it on plain wooden boards, on which they laid wax after they had written on the wood. Pliny aſſures us, that the writing on wooden

boards

boards was a cuſtom even before the Trojan war. Such boards have been ſometimes ſimply named *Cera*, from which originate the deſcription *Cera prima*, *Cera ſecunda*, *Cera tertia*, &c. which ſignifies the firſt ſecond, and third page. The ancient Juriſts unite often the words *Tabulæ* and *Ceræ*. It appears notwithſtanding, that they deſcribe under the denomination of *Tabulis*, a carefully written work, and under that of *Ceris* and *Pugillaribus*, they comprehend a careleſs written manuſcript, or copy of writing. Numerous teſtaments have been made on *Tabulas ceratas*. But I recommend attention to the ſtated boards or tables, to prevent miſrepreſentation; becauſe, under the general deſcription of *Tabulæ*, is often underſtood not only wooden boards, but alſo ſtone, ivory, and metal tables and plates.

The Romans employed for common uſe, and principally for writing letters, ſmall boards

boards of common wood, overlaid with bees wax, which were ſealed in linen clothes; and, if the laſt will was written upon theſe boards, they were run through, and joined together with lace or tape. They uſed likewiſe very thin levelled boards, of ſoft wood, named, according to Martial, *Tenues tabellas*, which were not overlaid with wax, but in which the letters were carved.

In the archives of the town-hall in Hanover, are kept twelve wooden boards, overlaid with bees wax, on which are written the male and female names of owners of houſes, and of houſes without noticing the ſtreets; but, as Hanover was divided, in 1428, into ſtreets, we have reaſon to believe, that theſe wooden manuſcripts are more ancient. Theſe boards are apparently of beech wood, and have on the four corners an elevation, and the places within are filled up with green wax.

wax. The firſt and laſt table ſerve, at the ſame time, as a cover, and are, therefore, only on one ſide overlaid with wax, but the others on both ſides. Theſe twelve boards form therefore only twenty-two pages; the outſide boards are joined by a piece of leather paſted on them, to form the back of the book, and the leather is faſtened, by nails, to the other ten boards. This curious manuſcript book is one foot five inches high, eight and an half inches wide, and about five and an half inches thick, or each leaf about half an inch. There is, beſides the before-mentioned elevation on the four corners, another croſs elevation, which divides every ſheet into four ſquare columns: on each page are between ſixty and ſeventy lines of Monkiſh letters, which are apparently preſſed in the wax with a feſcue. Seven pages are in good preſervation. Another manuſcript, much like this, is in the gallery at Florence, in the third room in the eleventh ſcrine; another

another in the city library of Geneva; and ſeveral are ſtill exiſting in other libraries and archives, of which I only will notice the wooden Runen-almanack; and the waxed boards which are, according to Lewis of Straſbourgh, ſtill preſerved in the church of the Saltines at Halle.

The rich Romans uſed, inſtead of wooden boards overlaid with bees wax, thin pieces of ivory, named *libri eborei*, or *libri elephantini;* and Ulpian ſtates, that the principal tranſactions of great princes have been uſually written with a black colour on ivory. Flavias Vopiſcus ſays, that there was a book of ivory in the library of Ulpian. The exiſtence of ivory books has been fully aſcertained by Martial, Salmaſius, and Schwarz, notwithſtanding other authors have held out, that the name of *libri elephantini* originates from the enormous ſize of theſe books, or from the inteſtines of elephants, on which they have

have been written; but this is certain, that only the great and the rich were able to uſe ivory tables, becauſe they were ſcarce and dear.

It muſt be obſerved, that theſe wooden tables overlaid with wax were of different ſizes; and, according to Quintilian, likewiſe uſed to teach writing to beginners; and, according to Cicero, it ſeems that the critics were accuſtomed by reading wax manuſcripts to notice obſcure or wrong phraſes, by joining a piece of red wax. The Greeks and Romans continued ſtill to make uſe of ſuch boards, even at the time when writing on leaves of trees, on Egyptian Paper, on membranous ſubſtances, and on parchment, was already adopted, becauſe they could thereupon put down their fugitive ideas, and change or correct them eaſily, before they wrote on other ſubſtances; and it has been proved, that even when linen Paper was firſt diſcovered,

ſuch

ſuch boards have been ſometimes made uſe of. The Chineſe have, in very ancient times, likewiſe written with large iron tools on boards, pieces of bamboo, and occaſionally on metal.

Curious reſearchers are recommended to conſult Perizonius's inſtructive notes upon the 12th chapter of the 14th book of Aelian's Various Hiſtory, where we are informed alſo, that theſe wooden table-books were often made of the linden or lime-tree, as well as of box, to which the maple may be likewiſe added, which, being capable of an elegant poliſh, was uſed for the ſame purpoſe. Thus Ovid ſays,

——— *Veneri fidas ſibi Naſo Tabellas*
Dedicat, at nuper vile fuiſtis Acer.

——— This truſty table-book,
To thee, O Venus, now I dedicate,
Which was but worthleſs maple-wood of late.

But

But box was nevertheleſs commonly uſed, and we may judge of the ornaments of thoſe wooden books from the following diſtich in Propertius.

*Non *illas fixum caras effecerat aurum,*
Vulgari buxo ſordida cera fuit.

With gold my tablets were not coſtly made,
On common box the ſordid wax was laid.

The uſe of boards was ſuperſeded by the uſe of the leaves of palm, olive, poplar, and other trees. According to Pliny, the Egyptians were the firſt who wrote on palm leaves, for which reaſon their letters obtained the name of Phœnixcian letters, becauſe the Greeks called the palm-tree *Phœnix*. In the library of the city of Strahlſund is a book ſtill to be ſeen, written on palm leaves. The Malabars yet write on leaves of the palm, *Corypha umbra culifera*, and form the letters with a feſcue at leaſt twelve inches long, and anoint the leaves

* *Tabellas.*

leaves afterwards with oil. The written letters are rolled up. Their books are of many ſuch leaves, which are joined together with a tape, and framed between two thin boards of the ſame ſize. There are Bibles ſtill preſerved, written on ſuch leaves; one of them, the Telugian or Warugian Bible, is to be ſeen in the library of the univerſity of Gottingen, containing 5376 leaves, formed into forty-five ſheets, which has been purchaſed from Baumgarten, in a public ſale; another is at Copenhagen; and one in the Orphan's houſe, at Halle; which are all the copies of this ſcarce work to be found in Europe; but that preſerved at Halle is, according to Dreyhaupt, not written in the Telugian, but in the Damulian language. The explanation of twelve large volumes, with plants of Malabar, to be ſeen in the Academical Muſeum at Gottingen, is moſtly drawn with a feſcue on palm leaves. In Heſſelberg's library, at Copenhagen, was a

part of the New Teſtament, written in the Malabar language, on palm leaves. The Bramin manuſcript, in the Kulingiennian language, which was ſent from Fort St. George to Oxford, is of Malabar palm leaves; and Mr. Aſtle ſtates, in his Origin and Progreſs of Writing, (chapter iv. page 49,) that in Sir Hans Sloane's library were more than twenty manuſcripts of palm leaves, written in different Aſiatic languages; and he ſays, (chapter viii. page 203,) that he himſelf is in poſſeſſion of a manuſcript, written on palm leaves, in the Peguan language, which is twenty-one inches long, and three inches and an half wide; the ground of which is richly ornamented with gold, and the letters are inlaid with a black gummy-like ſubſtance.

Knox ſtates, in his Hiſtory of Ceylon, that there grows a kind of palm tree, of which the leaves are woolly, and of conſiderable breadth, named the pananga tree, which

which are uſed by the inhabitants for writing, after having taken off the outer ſkin. They uſe talipot-tree leaves for the ſame purpoſe.

Pliny, who was a diligent enquirer into antiquity, ſays, ſpeaking particularly of the Egyptians, that they wrote upon the leaves of palm trees; or, according to the various reading of *malvarum* for *palmarum*, upon the leaves of mallows. But it is probable, the ancients wrote upon any leaves that they could make fit for that purpoſe. Hoffman, in his Lexicon, under the word *palma*, ſtates, from Petrus de la Valle, that the Indian Brachmans write upon the leaves of palm trees, and that one of them made him a preſent of a book compoſed of theſe leaves. It was likewiſe the cuſtom of the Sibyls of old to write their prophecies upon leaves, as appears by the following lines in Virgil, (Æneid, lib. iii. v. 443.)

A raging propheteſs you there ſhall ſee,
Who from her cave ſings what the fates decree;
Her myſtic numbers writes on leaves, and then
In order lays, and lurks within her den;
Before the door they lie, as they were plac'd,
But if that opening, or ſome ſudden blaſt
Should them diſorder, ſhe no more will ſing,
Nor when once ſcatter'd, to contexture bring.

This uſage of the Sibyls writing upon leaves was ſo current, that it became proverbial among the Romans to uſe *folium Sibyllae* for any undoubted truth. Thus Juvenal ſays,

Credite me vobis folium recitare Sibyllae.

Believe me, what I here declare to you,
Is truth itſelf; no Sibyls leaf more true.

The ſentence of baniſhment or *pedaliſm (petaliſmus)* of the Syracuſans, according to Diodorus Siculus, was written on olive-tree leaves; and on the ſame kind of leaves were written the names of thoſe who were excluded from the Senate of Athens, which puniſhment was called *Ekphyllophoreſis.*

The

The Eaſt Indians have, and ſtill uſe, in ſome parts, leaves for writing. And, according to Helvetius Cinna, poplar-tree leaves have been likewiſe uſed.

The inhabitants of the Maldivia iſlands write on leaves of the macarcquo tree, which are three fathoms long, and one foot wide; and ſometimes on thin wooden boards after they have been painted white. In many places in the Eaſt Indies, the leaves of the muſa or banana tree were uſed for writing, till the Europeans introduced paper; and in the iſland of Java they ſtill write on the leaves of the lantor tree, which are very ſmooth, and five or ſix feet long. Several other eaſtern nations uſe, for that purpoſe, the leaves of the cocoa tree, the taon-condar tree, and of a tree named, by the Malays, olen, which grows every where plentifully in that country, and is a kind of wild palm tree, the leaves of which are about one yard and

an half long, and three inches wide; for extenſive writings they are tied together. The letters are written thereon with an iron tool, which pierces the outſide covering, and makes indelible letters, which method is preferred by the Indians, becauſe they are ruled by the touch and not by the eye: thoſe leaves have a quality which makes them preferable to our paper; they are not only very ſtrong, but, if they remain even for a long time in water, they are not liable to rot or grow tender, and the writing is not deſtroyed, for which reaſon the natives continued to uſe them, notwithſtanding many paper-mills have been erected in India. It is remarkable, that poplar-tree leaves were principally uſed for ſacred writings, which may be the reaſon why Pythagoras calls the leaf of the poplar-tree, a ſacred leaf.

The cuſtom of writing on leaves of trees was ſuperſeded by the uſe of the raw bark

of

of trees, and the interior bark of the lime tree, of which Suidas remarks, that it reſembles *Papyrus*; and alſo the bark of elder, elm, and birch tree. The exterior bark (*cortex*) was ſeldom uſed, being too coarſe in general, and not ſufficiently ſmooth to write on legibly and eaſily. The interior bark (*liber*) was therefore preferred, being ſmooth and fine. From this originates the Latin name for a book. To carry thoſe barks commodiouſly in the pocket, they were rolled up, and called *volumen*; which name has been continued for rolls of paper and parchment, and for books, notwithſtanding our books have a a very different ſhape. The name *codex*, or more properly *caudex*, ſtill in uſe, originates in a like manner: and notwithſtanding its true meaning is the trunk of a tree, it was adopted to deſcribe many ſheets of the ſaid bark-ſhavings together.

The ſhape of the bark-ſhavings on which

the ancient Europeans wrote was not all of the ſame ſize, and thoſe manuſcripts are very ſcarce. Montfaucon ſays that there are none in Italy, and that he found only one in the archives of the city of St. Denis, in France. Cragus ſaw in the city of Chur, in Switzerland, ſome verſes of Virgil written on the interior bark of the birch tree. It is ſtated in *Acta Petropolitana*, tom x. page 449, that many whole books of this kind have been found in Siberia, the letters of which were in the language of the Calmuks. The ancient favorite ſong: *Eija mit hierta ratt innerlig*, &c. was called the Birch ſong, becauſe Elſa, the daughter of Andres, had originally written it on the bark of a birch tree. The protocols of the Emperors were in theſe times written on the ſame writing-material to prevent falſifying, becauſe, if the ſurface was ſhaved in the ſmalleſt degree, the letters were deſtroyed, and could not be replaced by others. Several nations uſe it ſtill for writing,

writing, notwithſtanding paper is well known to them. Mr. von Juſti aſſerts that he poſſeſſes a letter written, in the Malabar language, on the bark of a tree; and the Orphan-houſe at Halle, in Germany, poſſeſſes likewiſe a large manuſcript with Bomanian letters. In Sir Hans Sloane's library, was a manuſcript written in Pattanian characters; and a letter of a Nabob, two yards long, richly ornamented with gold. In the Britiſh Muſeum are ſeveral pieces of the exterior and interior bark of trees, written on; and many more are in other Britiſh libraries. In the gallery of the Grand Duke of Tuſcany, at Florence, in the third apartment and the eleventh partition, are ſeveral writings on bark, but not ancient: but of the antiquity of a very great number of the like manuſcripts in the Vatican library, in Greek, Hebrew, Arabic, and Latin, there is not the leaſt doubt.

To

To this ſucceeded the method of painting the letters with pencils, on linen and cotton:—whether theſe cloths were of the ſame kind as thoſe now in uſe, cannot be aſcertained. According to Symmachius, a great many of the prophecies of the Sybils were likewiſe written on linen cloth. And Livy ſtates the ſame, of the annual regiſters of the Romans. But Pliny ſays, linen was only uſed for writing in private affairs, notwithſtanding, Livy and Claudian, and the Theodoſian Codex have proved the contrary; and in the latter (tit. xxvii. cap. 11.) is principally noticed a law, written on *mappas linteas*. The Chineſe wrote two thouſand years ago, in the reign of Tſin, before they invented the art of making paper, on pieces of linen or ſilk, cut to ſuch a ſize as they wiſhed to have the book. But it was not uſual for the Greeks to write on linen. Count Caylus remarks, that there were found, ſometimes in the boxes containing Egyptian mummies, very neat cha-

characters

characters, written on linen. It ſeems natural, that all linen, uſed for writing, muſt have been ſteeped in ſize or gum, or the ink and paint muſt have blotted.

Of the inhabitants of Partha, it is ſaid that they wrote upon the ſame ſtuff of which they made clothes. And ſome Indians write yet on a kind of cloth, named *Syndon*.

But, as linen was too much ſubject to become mouldy, animals were then attacked, to furniſh ſtuff for a writing material:—their ſkins (*coria*) were principally uſed to write upon, after they had been tanned on both ſides: thoſe of ſheep, goats, and aſſes were preferred. Several books, written on theſe, were in the Vatican library; in that of the King of France; and in ſeveral others. In the convent of the Dominican monks at Bologna, are two books of Eſdras, written on aſſes ſkins, which

are

are ſaid to be the original manuſcripts of Eſdras himſelf: but it is certain that it has been written only about five hundred years ago, and it looks like leather. This copy was given to the Prior Aymerico, of that convent, by a Jew, in the commencement of the fourteenth century, who by this bribe endeavoured to ſecure his fellow Jews againſt the Inquiſition, and therefore to make it the more precious and valuable aſſured the Prior it was the genuine hand-writing of Ezra.

The ancient Perſians and Ionians wrote on hides from which the hair was ſcraped. And the ſhepherds in former times wrote their ſongs with thorns and awls on ſtraps of leather, which they wound round their crooks.

The Icelanders ſcratched their *runes*, a kind of figurative writing, or hieroglyphic, ſometimes on walls: and it is noticed in the

the *Laxdaela Saga*, that Olof, at Hiardarhult, has built a large houſe, on the balks and ſpars of which he has got engraved the hiſtory of his own and more ancient times: and Thorkil Hake wrote his own deeds, in thoſe hieroglyphics, on his chair and bed. The most ancient *runes* are traced to the third century; and the most ancient hiſtorian, who mentioned them, is Venantius Fortunatus, who lived in the ſixth century.* Of theſe letters, or hieroglyphics, there were no more than ſixteen in the whole; but as, in the year one thouſand, the Chriſtian faith was introduced into Iceland, they were found inſufficient, and Latin letters were adopted.

Puricelli maintains, that the Italian Kings, Hugo and Lotharis, had given a grant to the Ambroſian church, at Milan, written on the ſkin of a fiſh, which Muratori

* He ſays in Carm. vii. 18, Barbara fraxineis pingatur *Runa* tabellis.

Muratori took for a kind of parchment by the want of ſufficient inveſtigation.

Not only the ſkins of animals were uſed for a writing ſubſtance, but alſo bones and entrails, if they were thought to be fit for that purpoſe. In the hiſtory of Mahomet, is ſlightly noticed, that the Arabians took the ſhoulder-bones of ſheep, on which they carved remarkable events with a knife; and, after tying them with a ſtring, they hung their chronicle up in their cabinets.

In the library of the Egyptian King Ptolomœus Philadelphus, which is ſaid to have contained 700,000 volumes, were the works of Homer, written in golden letters on the ſkins of ſerpents and other animals; and under the reign of the Emperor Baſiliſkus, was burned, at Conſtantinople, a manuſcript one hundred and twenty feet long, written on the inteſtines of beaſts, &c.

in

in golden letters, containing Homer's Iliad and Odyſſey. In the library of the Emperor Zeno Iſauricus were likewiſe Homer's works, painted in golden letters on the entrails of animals: and we know, from Iſodorus, that the inteſtines of elephants have been alſo uſed for writing.

But theſe writing-materials were neither common writing-maſſes nor in general uſe, and regarded rather as a rarity. There is in his Majeſty's library at Hanover a letter engraved on a golden plate, written by an independant prince of the coaſt of Coromandel to King George the Second which is about three feet long and four inches wide, and inlaid on both of the narrow ſides with diamonds, which was delivered to the late Mr. Scheidt, to be there kept.

We arrive now at the period when the Egyptian Paper was invented, and manufactured from the rind of the Paper-plant,

Papyrus,

Papyrus,* which grows in the marſhes on the borders of the Nile, and is called in the Egyptian language *Berd*, or *al Berdi*. Theophraſtus, Pliny, Guilandin, Proſper Alpin, and other authors, deſcribe the Egyptian

* The Egyptians call it *Berd*, and they eat that part of the plant which is near the roots. The internal part of the bark of this plant was made into paper; and the manner of the manufacture was as follows: Strips, or leaves of every length that could be obtained, being laid upon a table, other ſtrips were placed acroſs, and paſted to them by the means of water and a preſs, ſo that this paper was a texture of ſeveral ſtrips; and it even appears that, in the time of the Emperor Claudius, the Romans made paper of three lays. Pliny alſo ſays, that the leaves of the *Papyrus* were ſuffered to dry in the ſun, and afterwards diſtributed according to their different qualities fit for different kind of paper; ſcarce more than twenty ſtrips could be ſeparated from each ſtalk. This paper never exceeded thirteen fingers breadth. In order to be deemed perfect, it was to be thin, compact, white, and ſmooth. It was ſleeked with a tooth, and this kept it from ſoaking the ink; and made it gliſter. It received an agglutination, which was prepared with flour of wheat, diluted with boiling water, on which were thrown ſome drops of vinegar; or with crumbs of leavened bread, diluted with boiling water, and paſſed through a bolting cloth. Being afterwards beaten with a hammer, it was ſized a ſecond time, put to the preſs, and extended with the hammer.

Egyptian Paper-reed to be a plant of the ruſh kind, which grows in ſwamps about ten cubits long. The ſtalk is triangular, and of a thickneſs to be ſpanned; its root crooked; ſurrounded, near the root, with ſhort leaves, but naked on the ſtalk. This ſtalk has on the top a buſh, which reſembles in ſome reſpects a head with hairs, or of long, thin, ſtraight fibres; the root is brown. After Pliny, Guilandin furniſhes us with the beſt deſcription of the *Papyrus*, and the method how it is prepared for the uſe of writing; all other ſubſequent authors have, more or leſs, copied them.

The Egyptian Paper-reed which according to Strabo grows only in Egypt and India, and of which in the year ſeventy-nine, after the birth of Chriſt, a ſpecies was found in the Euphrates near Babylon, which was equal in quality to the genuine Egyptian *Papyrus* for making Paper, muſt not be miſtaken, as Ray and others did, for

the Papero-plant growing in Sicily, which much reſembles the other. Lobel has given a deſcription of the Sicilian Papero, in his *Adverſariis,* and it does not ſeem that it has been uſed in ancient time for making Paper: it is only lately that the Chevalier Savario Landolina has ſent ſamples of Paper to the ſociety at Gottingen, manufactured from this plant, according to the deſcription which Pliny has given of the manufacture of *Papyrus.*

Many authors believe that the Egyptian Paper-plant is no more exiſting, which does not ſeem likely, becauſe it was a plant in many reſpects of the ruſh kind; but by the changes which the ſoil in that country has experienced, it may have become ſcarcer. Nevertheleſs, it is not noticed by Pocock; and Shaw notices it only amongſt the hieroglyphics of the ancient Egyptians. Maillet obſerves (which ſeems to be improbable), *Je ſerais cependant aſſez*

porté

porté à croire, que ce n'eſt autre choſe que la plante appellée au Caire figuier d'Adam, *et par les Arabes* Mons. Moſt of the modern geographers, who deſcribe Egypt, take no notice of this plant, which may lead us to believe that they have either no knowledge thereof, or thought it no object of conſequence, but not that it exiſts no longer: and, as Pliny ſtates that *Papyrus* was not only uſed for making Paper, but for numerous other purpoſes, which he deſcribes, we muſt preſume that care would have been taken to preſerve ſuch an uſeful plant.

The Egyptian Paper was manufactured from the fine pellicles of the *Papyrus* which ſurrounded the trunk (the fineſt of which were in the middle), and not from the marrow of the plant. Theſe pellicles were ſeparated by means of a pin, or pointed muſcle-ſhells, and ſpread on a table ſprinkled with Nile water, in ſuch a form

as the ſize of the ſheets required, and waſhed over with hot glue-like Nile-water. On the firſt layer of theſe ſkins, a ſecond was laid croſs-wiſe to finiſh the ſheet, *(Plagula)* which was preſſed, hung up to dry, and ſmoothed and poliſhed with a tooth. The Nile-water was laid on with great care, to prevent ſpots in the Paper. Twenty ſkins were the utmoſt which could be ſeparated from one ſtalk, and thoſe neareſt to the pith made the fineſt Paper.

Twenty ſheets, glued together, were called *ſcapus*, but ſometimes ſeveral *ſcapi* were glued together, to form a large *volumen*. This part of the buſineſs was executed by the *Glutinatoris*, the work of whom reſembles in many reſpects that of the book-binders in our time. All perſons who worked in theſe Paper-manufactures had names according to their work.

With reſpect to the time when this Paper

Paper was invented there are different opinions; and even the name of the inventor is unknown. Some authors have tried to prove its antiquity from Homer, Heſiod, and Herodotus, and conjectured that Moſes had written his books on Egyptian Paper, whereas Varro ſtates that the invention was not known in the time of Alexander the Great, which is about four hundred years before the birth of Chriſt; but as Ariſtotle mentions the book-moths as well-known inſects, it ſeems likely that the invention is more ancient; and Pliny refutes Varro, by quoting Caſſius Hemina, who ſtates that a writer named Terentius, by digging a piece of land on mount Janiculum, found in a ſtone box the books of Numa, written on Egyptian Paper, which was completely preſerved, notwithſtanding it had been 350 years buried in the earth, becauſe it had been ſteeped in oil of cedar; and that Mucian, who was three times conſul, had aſſured him, that during the

time he was commander-in-chief in Lycia, he had ſeen there, in a temple, a letter of the Lycian King, Sarpedon, written on Egyptian Paper. It is true Guilandin has proved that the Paper-reed was known long before the reign of Alexander the Great, which he ſtates was uſed for ſeveral purpoſes, but thereby cannot be poſitively aſcertained that it was uſed as Paper-ſtuff.

Nevertheleſs, it is remarked by Varro, that ſoon after the time that Alexander built Alexandria in Egypt, the making paper of the *Papyrus* for writing on, was firſt found out in that country. On the invention of which, all the other ways of writing were in a great degree* ſuperſeded; no

*This muſt be underſtood, with ſome reſtriction; for wooden table-books continued in uſe for ages after. The father of John the Baptiſt, did not aſk for pen, ink, and paper, but a writing-table, to write his name in. Nay, they were common ſo late as the fourth century, as appears from the ſtory of Caſſianus, told by Prudentius

no materials till then invented being more convenient to write upon than this. Therefore when Ptolemy Philadelphus, King of Egypt, began to make a great library, and to collect all ſorts of books, he cauſed them to be all copied on this new invented paper. And it was exported alſo for the uſe of other countries, till Eumenes, King of Pergamus, endeavouring to form a library at Pergamus, which ſhould

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Prudentius as follows: Caſſianus was the firſt Biſhop of Siben in Germany, where he built a church in the year 350. But being baniſhed from thence by the infidels, he fled to Rome; and was afterwards obliged to keep a publick School for a living at *Forum Cornelii*, now called *Imola*, an epiſcopal city in Italy. But in 365, he was taken by order of Julian the Apoſtate, and expoſed to the incenſed cruelty of his ſcholars, who killed him with their *pugillares*, having firſt tortured him with great cruelty with the ſame *ſtyles*, with which he had taught them to write. From hence it appears, that ſome of thoſe table-books, eſpecially ſuch as ſcholars learned to write in, were pretty large and heavy. Which is alſo confirmed by ſome lines in Plautus, where he ſays, that a boy of ſeven years old, broke his maſters head with his table-book,

ſhould outdo, that at Alexandria, occaſioned a prohibition to be put upon the exportation of that commodity; for Ptolemy, to put a ſtop to Eumenes's emulation in this particular, forbad the carrying any more paper out of Egypt. This put Eumenes upon the invention of making paper of Parchment, and on them he thenceforth got copied ſuch of the works of learned men, as he afterwards placed in his library; and hence parchment is called *pergamena* in Latin, from the City Pergamus, in Leſſer-Aſia, where it was firſt uſed for this purpoſe amongſt the Greeks. But that Eumenes, on this occaſion, firſt invented the art of making parchment, is dubious; for in Iſaiah viii. 1. Jeremiah xxxvi. 2. Ezekiel ii. 9. and other parts of the Scriptures, we find mention made of rolls of writing; and might not thoſe rolls be of parchment? And it is ſaid by Diodorus Siculus, that the ancient Perſians wrote all their records on ſkins; and

Herodotus

Herodotus tells us of ſheep-ſkins and goat-ſkins having been made uſe of in writing by the ancient Ionians many hundred years before Eumenes's time. It ſeems therefore poſſible, that Eumenes found out a better way of dreſſing them for this uſe at Pergamus, and perhaps it thenceforth became the chief trade of the place; and either of theſe is reaſon enough from *pergamenus* to call them *pergamenæ*. There is indeed in our Engliſh tranſlation of Iſaiah's prophecy concerning Egypt, mention made of paper reeds by the brooks, (chap. xix. 7.) which prophecy was delivered four hundred years at leaſt before the time that Varro places the Egyptian invention; by this one would imagine that paper made of thoſe reeds was in uſe when that prophecy was written;* for why

* The learned Dr. Gill is of that opinion; for in his commentary upon the aforeſaid verſe in Iſaiah, he ſays, "On the banks of the Nile grew a reed or ruſh, called by the Greeks *papyrus* and *byblus*, from whence come the

why were they called paper-reeds, if not applied for that purpoſe? But little ſtreſs can be laid upon this paſſage, becauſe the learned are not agreed about the meaning of the original Hebrew word, which is there tranſlated paper-reeds. However, let it be the *papyrus*, or let it be *parchment*, that was firſt found out to write upon, it is certain that the uſe of parchment has long out-laſted that of the papyrus; for books made of this material are now great curioſities. Euſtathius, in his comment upon the twenty-firſt book of Homer's Odyſſey, remarks that it was diſuſed in his time, which is near ſix hundred years ago.

The Paper manufactured in Egypt was rather of an inferior quality, and the Romans prepared

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the word *paper*, and *bible* or book, of which paper was anciently made, even as early as the time of Iſaiah, and ſo many hundred years before the time of Alexander the Great, to which time ſome fix the æra of making it.

prepared it more carefully, and paid more attention to the waſhing, beating, glueing, ſizing, and ſmoothing than the Egyptians. They ſized it in a ſimilar method as we do rag-paper, but they made their ſize of the fineſt flour, which was ſtirred in boiling water with a few drops of vinegar and ſome leaven, and then filtered. It was after the firſt ſize beat with a hammer; ſized the ſecond time, preſſed, and then ſmoothed. This Paper of the Romans was very white, and according to Pliny, never more than thirteen inches wide.

Pliny and Iſidorus have informed us that the Romans had ſeveral ſorts of Paper, to which they had given different names. Pliny mentions eight of theſe.

1. *Charta Hieratica,* of which were four different ſorts.

a. Charta Hieratica. This was a Paper not cleaned at all.

b. Charta

b. Charta Auguſta, (ſo called to pay reſpect to the Emperor Auguſtus) was improved by one cleaning.

c. Charta Liviana (named after the Empreſs) which was rendered ſuperior by a ſecond cleaning.

d. Charta Hieratica. This name was likewiſe given to Paper in full perfection.

The Romans named theſe four aſſortments in general *Charta Hieratica*, or Holy Paper, becauſe it was principally uſed for ſacred books and writings. All were eleven inches wide.

The *Charta Auguſta* had at firſt the preference, but being too thin for the writing-cane, in the fiftieth year after Chriſt, under the reign of the Emperor Claudius, it was improved by lining the Auguſtan Paper

Paper with an underlaying of the ſame Paper, which gave the name to

2. *Charta Claudia.* This Paper was better than *Charta Auguſta*, and two inches wider. I muſt obſerve, that all books preſerved in *Herculaneum* are written on Paper not underlaid; and that the firſt Paper was only written on one ſide. The *Adverſaria*, of which Pliny the elder left one hundred and ſixty volumes, were the only books preſerved in which the leaves were written on both ſides; two leaves being paſted together. It is ſaid that Julius Cæſar was the firſt who wrote *opiſtographically*, but only when he wrote letters to confidential friends.

3. *Charta Fannia.* *Palæmon*, a celebrated grammarian, had in the year five, ſeveral public work-ſhops, in which this Paper was prepared with more ſkill: it was uſually uſed for writing plays upon. It

was

was ten inches wide, and glazed with a tooth, ivory, or muſcle-ſhells.

4. *Charta Amphitheatrica,* which was much coarſer than the before-mentioned ſorts, and only nine inches wide.

5. *Charta Saitica,* which was only made in the city of Said, Salo, or Sahid, from the cuttings or ſhavings, and refuſe of other Paper, which was gathered throughout the country, and re-manufactured in this city: it was not full nine inches wide.

6. *Charta Tanitica,* which obtained that appellation from the city of Tanic, now Damietta.

7. *Charta Emporetica,* or ſhopkeeper's Paper, which was uſed to wrap goods in, was manufactured from the next pellicle under the rind of the Papyrus, and ſold by weight: but, being only ſix inches wide,

it

it was found to be inconvenient for covering and packing of goods. It has been called by ſome *Leneotica.*

8. *Charta Macrocolla,* or only *Macrocollum.* It received its name from its large ſize.

Several authors mention other ſorts: *Charta Libyana,* which was in quality next to the *Chartæ Auguſtæ, Charta Thebaica, Charta Carica, Charta Memphitica, Charta Corneliana,* after Cornelius Gallus, who was the firſt that had this paper manufactured. *Mellonis Pagina; Charta Blanca*; it obtained its name from its beautiful whiteneſs: this name is yet applied to a blank ſheet of Paper, which is only ſigned. *Charta Nigra* was the name of Paper painted black, and the letters written thereupon were of white and other colours.

The Egyptian Paper was manufactured in Alexandria

Alexandria and other Egyptian cities, in ſuch large quantities, that Vopiſcus ſpeaks of Fermies having boaſted, that he poſſeſſed ſo much Paper, that its value would maintain a large army for a long time. Alexandria was for a conſiderable time ſolely in poſſeſſion of this manufacture, and acquired immenſe riches, which was much noticed by the Emperor Adrian; and it is not at all ſurprizing, that the gain which the inhabitants of Egypt made from the trade and conſumption of this manufacture, during the ſpace of ſeveral hundred years, was exceedingly great; having it all to themſelves, and furniſhing Europe and Aſia therewith. At the end of the third century the commerce of Egyptian Paper was ſtill flouriſhing, and continued to the fifth century, notwithſtanding it was charged with a very high impoſt, which induced King Theodoric, a friend to juſtice, *after theſe impoſts were*, at the latter end of the fifth century, *greatly increaſed*,

increaſed, to deliver Italy therefrom at the commencement of the ſixth century. Caſſiodorus wrote on that ſubject a very remarkable letter (the thirty-eighth letter in his eleventh book) congratulating the whole world on the ceſſation of an impoſt on an article of commerce, ſo neceſſary for the convenience and improvement of mankind; and ſo highly oppreſſive to the cultivation and proſperity of arts, ſcience, and commerce.

It was ſtill uſed occaſionally in Italy until the eleventh century, but not generally, by reaſon of its laborious, difficult, and expenſive manufacture, and that the uſe of Parchment and Paper made of cotton became gradually introduced. Several authors differ again in ſtating the exact period when the uſe of Egyptian Paper was dropt; but this difference may originate from miſtaking the Paper made of Papyrus for that of the bark of trees, which was even con-

tinued to be uſed in the twelfth century, and ſhall be mentioned hereafter.

Some of that Paper is preſerved to the preſent time. It was already known in France in the fifth and ſixth centuries. Mabillon quotes ſeveral acts ſtill exiſting, written on Paper manufactured from the Papyrus, by the Kings Childebert the Firſt and Clodovic the younger; and Gregorius Turonenſis affirms in his letters, that it was generally uſed at an early period in the French Chancery. In the Abbey of St. Germain des Prez, at Paris, was a complete work written on Egyptian Paper. In the Royal Library at Paris was the *Charta plenariæ poteſtatis,* written on the ſame Paper. And Mabillon remarks that one of ſuch manuſcripts, written in the ſixth century, was in the Library of Mr. Petau, which Montfaucon could not get a ſight of.

In the Cottonian Library are four leaves of

of this Paper, on which the goſpels of St. Matthew and St. John are written.

Italy can produce ſeveral explanations of Pſalms, manuſcripts of the Fathers of the Church, Public Acts, &c. written on Egyptian Paper: amongſt them I muſt notice a ſcarce relick of the treaſury of St. Mark, at Venice, which is the goſpel of St. Mark, written by himſelf, of which ſome leaves have been conveyed to Prague, by the Emperor Charles IV. It is kept with great veneration and care in a ſilver caſe gilt, which is in the form of a book, and conſidered to be the moſt precious piece of the whole treaſury, notwithſtanding no perſon is able to diſtinguiſh a ſingle letter, being ſo much injured by time, that it tumbled to aſhes when only touched. Zanetti diſcovered in the cabinet of Mr. Nani, a diploma of Papyrus, a Venetian ell long, and half an ell wide. And lately was found, in the archives at Florence, a document

which is apparently written between the years of 454 and 469, of ſix feet by two; many others are exiſting in Italy, too numerous to ſpecify.

Amongſt the ſeveral documents written on Egyptian Paper, at Vienna, is a diploma of Pope Benedict III, of twenty one feet by two: and a document in Latin, which is entirely preſerved. The record of Ottokar, King of Bohemia, is likewiſe written on Egyptian Paper. In the Electoral Library at Munich, is a manuſcript on reed; and in the Library at St. Gall in Switzerland, is a Codex of this Paper, on thirty leaves in quarto, written in the ſeventh century, with *Uncial* letters, containing the *Homilias St. Auguſtini et Iſidori.* In the Library at Geneva are two manuſcripts, according to Mabillon and Montfaucon, of the fourth and fifth century. I could quote many more remains of Egyptian Paper, noticed by Mabillon, Vacchieri, Gerkens, Lambecius,

cius, and other authors; and other manuſcripts lately diſcovered by ſcientific travellers; but, as it would extend this account beyond my intended limits, I ſhall now turn to another Paper-material, which is more ancient than the Paper of Papyrus.

Charta Corticea, or Paper of the Bark of Trees, manufactured of the *membrana ligni tenuiori*, and likewiſe uſed for writing, is difficult to be diſtinguiſhed from the Egyptian ſhrub-paper, called *Charta papyracea ex pelliculis herbæ Ægyptiacæ*, and therefore often conſidered to be the ſame; and ſeveral authors deny it ever to have exiſted. But if they had carefully examined theſe two ſorts, they would have diſcovered their error, and the difference.

The *Charta Corticea* has been, as aforeſaid, made of the fine ſkinny ſubſtance ſeparated from the interior ſide of the bark

of ſuch trees as were fit for that purpoſe, which has been moſt likely formed into Paper by waſhing, beating, and plaining, like the Paper of Papyrus. But it had always three or four couches, which were glued together, and was therefore through its thickneſs not only more brittle, but the united pellicles often ſeparated; principally the upper couch which was written on, and the writing became, therefore indiſtinct and uſeleſs. The *Codices* of *Charta Corticea* are for the major part written in Latin, which gives us reaſon to ſuppoſe, that it was uſed principally in the weſtern countries, where the Egyptian Paper could not be obtained, or was very expenſive, and the inhabitants were therefore obliged to try to make their own paper. All ancient documents in Germany which are not written on parchment are in general on Paper made of ſilk, wool, and the bark of trees; but theſe on Paper made from Papyrus are ſcarce, and a much experienced

eye

eye is only able to diſtinguiſh one from the other. In the Abbey of St. Germain is a remnant of a manuſcript, the upper couch of which has diſappeared with the letters. In the archives of the church at Gironne are preſerved the bulls of the Popes Romanus and Formoſus, of the years 891 and 895. They are about ſix feet long, and three feet wide, and are apparently formed by gluing the ſkins or leaves couchwiſe one to the other; and the writing remains legible in different places. The learned men in France could not agree, on the ſubſtances, of which this paper had been made, and differed in their opinions; ſome take it to be Egyptian paper, and others for paper made of the inner fibres of the bark of trees, and the laſt opinion was ſupported by the majority, which induced the Abbot Heraut de Belmont to write a treatiſe on thoſe differences of opinion; and according to the genealogic almanack at Berlin,

of the year 1788, many remnants of this curious paper are yet preſerved in ſeveral convents. In the Imperial Library at Vienna is likewiſe an original preſerved, which is a *charte blanche*, granted on this kind of Paper. The uſe of this Paper continued in France till the 12th century.

That, in the moſt ancient times, ſkins and hides* of animals have been uſed as a writing material I have before ſtated. In more modern times the ſkin between the hide and the fleſh was ſeparated, ſcraped, and by working and rubbing with quicklime, were formed into leaves, and called *Membrana*. Theſe were uſed by the Hebrews and Greeks; and the

Libro in corio, is not the particular name of books written on animal ſkins, but many times uſed for books of bark of trees; and, when Ulpianus ſpeaks of *libris in corio*, corium ſignifies no animal ſkin, but the bark of ſome other trees than the lime-tree, which has been named *coria*.

the Jews maintain that their anceſtors uſed them for writing on the Mountain of Sinai. It is certain that the Jews had at the time of David, books of the ſkin of animals rolled up called *Mgilloth*; and Herodotus aſſures us, that in remote times the ſkins of ſheep and goats were the uſual writing materials about 440 years before Chriſt. That the ancients have uſed ſkins of different animals for that purpoſe is apparent, by the words, *Membrana caprina, agnina, ovilla, vitulina, et hoedina*, which are found in ſeveral authors.

But ſuch membranes are very different from the true parchment, *Charta Pergamena.*

Ptolomæus the Firſt,* King of Egypt, who died in the year of Rome, 470, eſtabliſhed in Alexandria, a very extenſive

* Sometimes named *Soter* and *Lagus.*

ſive library, which was much enlarged by his ſon Ptolomæus Philadelphus, with the aſſiſtance of his librarian Demetrius Phalereus. Eumenes, King of Pergamus, as has been before ſtated, contended with, and endeavoured to ſurpaſs him if poſſible, which created jealouſy; and cauſed Ptolomæus to prohibit the exportation of Egyptian Paper, under heavy penalties. It may be that this prohibition was not ſolely occaſioned by jealouſy, but from the fear that his dominions, which were ſo much improved in arts, ſciences, and civilization, ſince the diſcovery of Paper, would be again reduced to a ſtate of ignorance for want of Paper, becauſe the plant failed ſometimes in unfavourable weather. The Pergamians were therefore obliged to deviſe other means for making Paper, and they diſcovered the manufacture of uſeful parchment, about 300 years before Chriſt, and in the fifth century of Rome which obtained its name

from

from the city of Pergam, or Pergamus, in Aſia (now Pergamo), the place where it was invented, and the art of bringing it to ſuch a ſtate of perfection, that according to Prideaux and Freret, it greatly ſurpaſſed the Egyptian Paper in fineneſs, ſmoothneſs, and ſtrength; and the art of making it very thin arrived likewiſe in a ſhort time to a ſurprizing degree of perfection. Rome manufactured the beſt parchment. The firſt inventor could only manufacture yellow parchment; yet in Rome it was ſoon improved, and made white: but as that delicate colour was too liable to tarniſh and ſpot, it was only made white on one ſide, and the other left yellow; and if it was to be uſed for writing on both ſides, it was coloured violet and purple, and the letters were written thereon in gold or ſilver. Gold was only uſed for ſacred writings, and principally for the Pſalms and Goſpels.

Joſephus

Joſephus ſtates, that the High-Prieſt Eleazar ſent to Ptolomaeus Philadelphus a copy of the Holy Scriptures which was to be tranſlated into Greek by ſeventy-two interpreters. The king greatly admired the beauty thereof and the fine membranes, (*tenuitatam membranae*) on which it was written with golden letters. But the tranſlation has been made in Egypt only 285 or 286 years before Chriſt, by the Synedrion, which conſiſted, like the Hieroſolymitanic, of ſeventy-two learned men, who not only made the tranſlation, before it was laid for the King, and introduced into the ſynagogues, but reviſed it with ſome alterations. It was only the Pentateuch, or the five books of Moſes, becauſe the other parts of the language of the Jews at that time were not conſidered as parts of their laws, and therefore leſs neceſſary for the Egyptian Jews; and it is clearly proved by the latter part of the book of Eſther, that it has been

tranſlated

tranſlated into Greek by another tranſlator.

All the world at that time did not uſe ſolely Paper and Parchment for writing upon, but ſtones and metals; the laſt were chiefly continued on account of its durability, and all nations had not attained a knowledge of the uſeful inventions of the Egyptians and Pergamians. Parchment came into uſe in Europe not before the ſixth century, which increaſed in the eighth and ninth; and England and Germany made very little uſe of Egyptian Paper for diplomas, but parchment, till the year 1280. I am informed that before the invention of Rag-paper, nothing elſe was uſed in Germany for diplomas than parchment; and, notwithſtanding, no map of parchment made before the ſixth century has been diſcovered.

With reſpect to the ſize, length, and width of the parchment, it was not regulated like the Egyptian Paper, and there are documents as ſmall as our playing-cards. There was likewiſe no adopted rule, if written at length or at the ſides; it depended on every one's fancy: but as it commonly was uſed only on one ſide, it was more generally written ſidewiſe than lengthwiſe, to ſave ſpace. When printing was invented, parchment was likewiſe printed upon; and at Berlin, Brunſwic, Paris, and St. Blaiſe,* are copies of a bible, printed in the year 1450, on parchment, by Guttenburg, in three folio volumes. At the Univerſity library at Helmſtadt is the *Officia Ciceronis*: and from the library of the late Mr. von Duve was ſold, by public auction, the very ſcarce work, printed on parchment, *Chronica Figurata totius mundi a Hartm. Schedelio, Doct.*

*An Abbey of the Benedictines, in the Black Foreſt, in the Biſhopric of Conſtance. The Abbot is a Prince of the German Empire.

Doct. Norimb. of. Anton. Koberger, printed in folio, 1493, with copper-plates.

Parchment ſhould be only made of calf-ſkins, to be entitled to its name; but it is in modern times likewiſe made of the ſkins of ſheep, goats, aſſes, and hogs. I ſhall not enter into a deſcription of the manufacture of parchment, or repeat the various ways in which it is uſed, new or old, but only obſerve that in France there is annually the value of upwards of a million of livres of parchment manufactured.

Every one well knows that the uſe of parchment is ſtill continued in Europe, not only becauſe it is more durable than paper, but alſo that it can be converted into ſize when old and uſeleſs. But the high price thereof prevents its general uſe; it would be therefore of great conſequence to the publick, if a ſubſtitute could be invented, equally as durable as parchment.

Such

Such a diſcovery would be highly beneficial, as it would not only encreaſe the writing and printing material, but reſerve ſuch a large quantity of animal ſkins for the uſe of leather, which becomes daily more ſcarce. In many libraries are manuſcripts of calves-parchment to be ſeen with painted pictures. The art of painting on parchment was common before the art of painting with oil-colours was diſcovered. The miniature paintings on parchment of Johannes de Brugges, painter to King Charles the Fifth, and thoſe of Julio Clavio, which were painted in the year 1500 in the Virgiluis of the Vatican merit to be noticed. And in the palace of the King of Naples has been preſerved a book with miniature paintings on parchment, by Macedo, Scholar of Michael Angelo. Parchment takes all kind of colours, but actually is only painted, red, green, and blue; except by the Dutch who dye it likewiſe yellow, and its principal

beauty

beauty is, that it can be made not only coloured but alſo tranſparent.

I ſhall now continue my hiſtorical account, and obſerve, that it is erroneous to ſtate that the Arabs invented, in the eighth century, the manufacture of Paper from cotton: and Caſiri, who ſtates it to have been diſcovered in the year 706, by Joſeph Amra, cannot deny that it was known before that time by the Chineſe and Perſians. The Arabians are therefore not the inventors, and acquired the knowledge of making it only in 704, by their conqueſts in Tartary. This invention became then more generally known, but the art of manufacturing it was only imported in the eleventh century into Europe; and neither is the year of its diſcovery preciſely known, nor the inventor's name. The firſt paper of that kind was made of raw cotton;* but its manufacture

* This muſt have been unknown to *Guetard*, or he would not have ſtated that he was the firſt who had

 aſcertained

manufacture was by the Arabians extended to old worn-out cotton, and even to the ſmalleſt pieces thereof.

But as there are cotton-plants of various kinds, it is natural that theſe muſt have produced papers of different qualities; and it was impoſſible to unite their woolly particles ſo firmly as to form a ſtrong ſubſtantial Paper, for want of ſufficient ſkill; and alſo for want of European mills (which are not yet eſtabliſhed by the Moors, Arabs, and Turks, who make uſe of mortars, and hand and

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aſcertained by experiment, that raw cotton-wool could be converted into Paper, without being previouſly uſed for clothing or other purpoſes. It ſeems he has been miſled by the Jeſuit *du Halde*, who ſays that the Chineſe made their Paper from cotton-rags. *Guetard* alſo aſſerts, that he was induced to make his experiments, becauſe he had not found an author who mentioned the practicability of making Paper from cotton-wool; and that by beating it to a pulp he has made fine white Paper of it. But if he had read *Theophilus Preſbyter* and *Monachus*, he would have been informed that in the Eaſtern countries it was cuſtomary to make Paper of cotton-wool.

and horſe-mills*), it was impoſſible they could bring their wool, by that method, and by boiling and beating, to a fine pulp, rendered intirely free from its woolly quality.

Not

* Thoſe who have travelled in Aſia and Africa take very little notice of Paper manufactures and mills. Niebuhr declares in the firſt volume of his travels (page 150) poſitively, that he ſaw in Egypt, neither water or wind-mills, and that the publick corn-mill, worked by oxen, at Kahira, was uſed not only for grinding corn, but likewiſe for preſſing oil-cakes; and that the common people grind their corn with very ſimple hand-mills. He gives of all theſe mills a deſign and deſcription, which enables us to aſcertain, that they cannot be employed for making paper. The Arabs and Turks give themſelves at preſent very little trouble for making paper, being plentifully ſupplied by the Italians and French. There is nevertheleſs near Conſtantinople, on a rivulet, a paper-mill, which is named in the Turkey language *Kehatjana*, or Paper-manufactory, and makes Cotton-paper. The Greeks uſe water-mills, and built this mill; all the other mills in Conſtantinople are Horſe-mills, of which ſeveral hundred were burnt in Auguſt 1782. Du Halde in his travels in 1697 takes no notice of Paper-mills in China, and mentions only a Paper-manufactory at Ming-hya. And Navarette ſtates not in his travels, publiſhed in folio at Madrid in the year 1676, at *Fon-gan* in his road from To-chew to Pekin, that he ſaw ſeveral paper-mills, as is erroneouſly tranſlated: he ſays only, that he ſaw ſeveral paper-manufactures, without naming them paper-mills.

Not diſcovering in ſuch ancient cotton-paper, ſtripes or water-marks, or the prints of wire reſembling thoſe of our moulds, we muſt preſume that their forms were not like our ſkilfully invented moulds, through which the water runs off, and the maſs remains therein united.

The Chriſtian diſciples of Mooriſh paper-makers, who ſince 1085, were in poſſeſſion of Toledo, and in 1238, of Valencia, worked the paper-mills to more advantage than their predeceſſors: inſtead of manufacturing Paper of cotton-wool (which is eaſily recognized by its being brittle and remaining always yellow), they made it of cotton-rags, in moulds through which the water ran off: for this reaſon it was called parchment-cloth. Beſide theſe denominations, the hiſtorians of that time call it *Charta, Xylina,* or *Goſſypina,* from the cotton-plant; *Charta Bombycina,* from the ſhrub *Bombax,* by which name it was likewiſe deſcribed

deſcribed in England; *Charta Cotonea; Charta Damaſcena;* and *Charta Serica.*

All civilized nations uſed firſt the Egyptian and then the cotton-paper, but had not any idea of uſing linen for the ſame purpoſe; and to this day the Eaſtern nations who manufacture their own Paper, and even the Greeks, employ only cotton-wool and cloth for that uſe; and are ſo much accuſtomed to ſtrongly glazed Paper, that when they receive Rag-paper from Italy and the ſouth of France, they glaze it till it reſembles our gloſſy linen cloth.

It is probable that the Greeks made uſe of cotton-paper ſooner than the Latins. And that it was brought into Europe by the Greeks, at an earlier period than by the Moors from Spain, there is no doubt. The Greeks received it from the Tartarian countries at the Bukarias; and through Venice it came into Germany, where it was known

in the 9th century by the name of Greek parchment. Greece, ſo much connected* by commerce with Aſia and Egypt; Italy, which was already in the 7th century frequented by the Arabs; Spain, which they conquered in the 8th century, and poſſeſſed to the latter end of the 15th; were, without contradiction, the European countries where cotton-paper was firſt uſed. The Arabs manufactured, at Cebta (which is, according to Manjanſius, now Ceuta), a cotton-paper, called Cebti; and Spain being ſo

* The connections of the Greeks with Italy and the Oriental Empire, and their navigation on the Black-ſea, conveyed the knowledge of cotton-paper eaſily to Europe, notwithſtanding no document of this paper has been preſerved from Greek antiquity, or noticed before the time of the Empreſs Irene, wife of the Emperor Alexius Comnenus, who at the latter part of the eleventh or at the commencement of the twelfth century, made three copies of the rules for her nuns at Conſtantinople, two on parchment, and one on cotton-paper. The Genoeſe and Venetians, who eſtabliſhed themſelves afterwards in the Crimea, and carried on commerce with the Greeks and the countries on the Black-ſea, took care of the exportation of cotton-paper to the European countries.

ſo near, could eaſily have been provided with it, until manufactories were ſhortly after eſtabliſhed at Xativa, (or Sateba,) Valencia, and Toledo.

The ſtuff for this paper, cotton, was moſt likely cultivated in Spain by the people who had conquered it, becauſe they came from a country where it was in general uſe, and they were therefore accuſtomed to it. There is yet more than one quality of cotton cultivated in Spain, and that commodity is conſidered in the Kingdom of Valencia as a home production; and it is not unlikely that the predeceſſors of the Arabs, (the Phœnicians and Carthaginians,) introduced it into Spain. Swinburne calculates the produce of cotton, the growth of Valencia, at 450,000 arobes, value 350,000*l.* which is in ſome meaſure confirmed by Twiſs, who ſaw, between Cordova and Granada, ſeveral fields full of cotton-plants* in his travels through Spain in 1772 and 1773.

The paper-manufactories at Xativa, Valencia, and Toledo, produced only very coarſe cotton-paper till the Moors were driven from Spain, either by the Arabians or Chriſtians. The Spaniards being acquainted with the uſe of water-mills, improved the method of grinding the cotton-wool and rags; and by ſtamping the latter in the mill, they produced a better pulp than from the wool, from which various ſorts of Paper were manufactured, nearly equal to thoſe made of linen-rags.

Spain ſtill poſſeſſes reſidues of cotton-paper. At the convent of Silos, is a Latin vocabulary, of intermixed parchment and thick cotton-paper leaves, written in *Gothic* characters, the date of which muſt have been prior to the reign of Alphonſus VI. as the

*Dillon, in his Travels through Spain, mentions cotton as a natural production, and it is ſurpriſing that *Ulloa*, a Spaniard, in his *Retabliſſement des Manufactures et du Commerce de l'Eſpagne*, has omitted the mentioning of cotton.

the uſe of *Gothic* writing was forbidden in 1129 at the council at Leon. As very few manuſcripts are found on cotton-paper from the 10th to the 12th century, but the major part on parchment, or intermixed, it muſt be ſuppoſed that at that time cotton-paper was ſcarcer than parchment, or that this mixture was neceſſary becauſe ſufficient parchment could not be obtained, and that the cotton-paper was too tender and more liable to break.

The Arabian author, Scherif al Edriſſi, certifies that in 1151 very fine white cotton-paper was manufactured; and Cacim Aben Hegi aſſures us that the beſt was made at Xativa.

The King, Peter II. of Valencia (or the fourth King of Arragon) iſſued, in 1338, a command to the paper-makers at Valencia and Xativa, under pain of puniſhment, to manufacture better Paper, which was to be

equal

equal to that formerly made. Mr. Meerman had in his poſſeſſion a piece of very coarſe cotton-paper, written upon in 1339, which proves that the art of paper-making was neglected by the Spaniards; and that prior to the middle of the 14th century no linen-rag Paper had been manufactured in that country. This has been fully aſcertained by the above gentleman, from the repeated examination of ſeveral pieces of Paper ſent to him for that purpoſe. Notwithſtanding, their ſcientific men perſiſt in its being linen-paper.

Cotton-paper came into uſe in France ſhortly after its invention; and until 1311, no other Paper than this and the Egyptian Paper was known in that country.

At what period cotton-paper was introduced into England cannot be aſcertained with accuracy. The moſt ancient manuſcript which can be produced is of 1049: and

and it appears that its uſe continued till the latter end of the 14th century, and that it has been gradually ſupplanted by the linen-paper, which came into uſe in 1342. All documents written between 1282 and 1347, which Ducarell erroneouſly ſtates to be linen-paper, are written on cotton-paper, as is the *Carmina aurea Salomonis Regis*, in *His Majeſty's library*, compoſed in the fourteenth century, in the Greek and Latin languages; at leaſt there is no reaſon to doubt what Mr. Meerman ſtates on this ſubject.

Of the introduction of cotton and linen Paper into Scotland, nothing can be aſcertained; and it is ſingular that it has not been noticed by Thomas Ruddiman. The ſame is the caſe with Ireland. But diſcoveries may yet be made in theſe countries.

The knowledge of cotton-paper came by means of the Greeks to Italy; and the art

of

of making it, in Sicily, through the invaſion of the Saracens. It is certain there was no linen-paper uſed before 1367.

The bulls of the Popes Sergius II. John XIII. and Agapetus II. were written in the eighth and ninth centuries, on cotton-paper. Dufreſne quotes under the article *Charta Cuttunea*, from *Rocchi Pyrrhi Sicilia Sacra*, a place where the family of a paper-maker is mentioned, but no time is noticed, notwithſtanding a full account is given of a cotton-paper manufacture which we have not of any other country.

The large paper-manufacture at Fabriano, in the *Marchia Anconitana* (which, according to Bartolus's deſcription, conſiſted of ſeveral different mills belonging to different perſons, although the whole formed only one manufacture), was eſtabliſhed long ago, but was enlarged from time to time, and manufactured, at the period when Bartolus wrote,

wrote, nothing but cotton-paper. This author died in 1355; ſo that it ſeems that 1367, or thereabouts, was the time when linen-paper was brought into uſe in Italy: and cotton might have been ſome time before mixed with linen-rags, till the ſuperiority of the latter was fully aſcertained.

As ſoon as the uſe of cotton-paper was adopted in Italy, it was alſo introduced into Germany; and, at the commencement of the ninth century, well known under the name of Greek parchment. Germany imported the paper ſome time before it manufactured it; and notwithſtanding it received the ſtuff through the ſame channel as the Paper, and that cotton and flax were ſpun and wove in the tenth century, the manufacture of cotton paper cannot be traced in Germany to ſuch an early period: all that can be poſitively aſcertained is, that in the middle of the fourteenth century, it was made by ſtamping-mills. But as Germany

many had in the thirteenth century, already cotton and linen manufactures, and exported conſiderable quantities thereof to Italy, it is fair to preſume that cotton paper was alſo manufactured.

Germany poſſeſſes numerous well-known relicks of cotton-paper, and amongſt the numerous manuſcripts preſerved in the archives, convents, and libraries, there may be ſtill more ancient documents than any which are yet come to our knowledge, and which remain unknown for the want of a preciſe examination. In the collegiate church and cathedral at Ganderſheim is a *plenarium* of the tenth century, which amongſt other rarities of that church boaſt of five documents and grants, given by the founders of the convent, between 844 and 968, by the Duke Ludolphus of Saxony, by his ſon the Duke Otto, and by the Popes Sergius the Second, Agapetus the Second, and Johannes the Thirteenth. The Plena-

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rium is likewiſe written on cotton-paper, in the reign of the Emperor Henry the Second, and atteſted in 1007 with the imperial confirmation by his notary Apel Peranſa. A large manuſcript of 1095 is at the Imperial Library at Vienna. The Univerſity Library at Erlangen has a collection of 420 manuſcripts on parchment, and 150 on cotton-paper. In the convent at Weirgarten are preſerved numerous codices and manuſcripts of all centuries, and on every kind of materials and paper. In the convent at Rheinau are 490 manuſcripts on different kinds of paper. The library at the Vatican contained 50,000 volumes, amongſt which there were 17,000 manuſcripts. In the city library at Augſburgh are numerous manuſcripts, and many of them in Greek more valuable than thoſe at the Vatican. The Library of the Convent at Tegernſee contains 1500 manuſcripts of the 8th, 9th, 10th, 11th, 12th, 13th, 14th, and 15th centuries; and in the Abby of St. Blaiſe, are

ſome

ſome of the fifth century. The univerſity Library at Harlem, and the Library of the Abby St. Emeran are rich in old manuſcripts; and the chapter at Salzburgh produces 58 *Codices chartaceos*, of cotton Paper, amongſt its collections.

I now conclude the hiſtorical account of the ſeveral ſubſtances which have been uſed as writing materials, with the invention of linen Paper.

The Royal Society of Sciences, at Gottingen, has, in the years 1755 and 1763, offered premiums to trace the exact time of this diſcovery; and Mr. Meerman printed in 1762 at Rotterdam, *Gerardi Meerman, Syndici Roterodamenſis, Admonitio de Chartæ noſtratis, ſeu lineæ, origine*, and offered 25 ducats to find it out. All reſearches were loſt and reduced to an uncertainty, through the exiſting remnants of cotton Paper, which was as before ſtated in uſe ſome centuries before

before the linen Paper, becauſe theſe two are in many reſpects ſimilar, and cotton and linen rags may have been at firſt mixed, which rendered it therefore more difficult to aſcertain when the firſt Paper was made from linen rags alone.

The Jeſuit Du Halde attributes this invention to the Chineſe; but as Gerbillon, and other modern travellers aſſure us that in the Paper-manufacture at Ming-hya, raw hemp was beaten and macerated with drugs, and then manufactured into Paper, this nation cannot excluſively claim the diſcovery of the art of making Paper from linen rags; and all authors agree that Europe is entitled to the merit of this invention, but they differ as to the time;* ſome trace it to the

* Hertius, who ſeemingly had no knowledge of cotton-paper, believes linen-paper was invented in the ſixth century.

Orlandi quotes a manuſcript of Homer in the Library at Geneva, written on linen-paper before the year 800.

the 8th, 10th, and others to the 11th and 12th century; and it is moſt likely that Paper has been made from linen cloth before it was attempted to be made from linen rags.

It is to be obſerved, that the invention of making paper from linen, has been preceded by the art of making paper of cotton-rags, which muſt be conſidered as a preparatory ſtep towards the uſe of linen-rags for the ſame purpoſe. But as this required ſome time, and improvements of the firſt diſcovery, it is therefore more natural that this invention

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Muratori believes that linen-paper has been firſt named *Charta bombycina*, and invented in the tenth or eleventh century.

Harduin will make us believe, that he has ſeen acts and diplomas written on linen-paper before the twelfth century; and Caſiri ſays; *Non pauca in regia Eſcurialenſi Bibliotheca extant monumenta, quae ante tertium decimum Chriſti ſeculum ſunt exarata.*

But Montfaucon ſtates the contrary, and inſiſts that he has not diſcovered, either in France or Italy, a book, inſtrument, or manuſcript written on linen-paper previous to *Ludovicus ſanctus*, who died ſince 1270.

vention is to be aſcribed, to a country, which was more familiar with linen, and its agriculture, than with the application of cotton.

Gregorius Majanſius, of Oliva; Franciſcus Perez, of Toledo; and Ferdinando Velaſco, of Madrid, endeavoured to trace this diſcovery in Spain, but could not prove that their country was entitled to the merit of it, being completely defeated by a number of other authors; and it ſeems that the Spaniards had no knowledge of linen Paper before the middle of the fourteenth century, and then it was not manufactured in that country, but imported; and it is moſt likely linen and linen-rag Paper were only manufactured in Spain a ſhort time before the art of printing was introduced. Spain cannot therefore claim the merit of this invention; notwithſtanding ſeveral places in Spain produce very good flax;* and even

 ſoon

* Twiſs relates that he found in the kingdom of Valencia

ſoon after that they manufactured Paper from linen rags, theſe manufactories went to

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lencia flax and hemp in abundance, where the commoneſt claſs of the people wore linen apparel. He obſerves alſo that the fruitful plains of Granada produced likewiſe flax and hemp. The cultivation of hemp and flax is at preſent very conſiderable; in Valencia are annually 25,000 cwt. of hemp, and 30,000 cwt. of flax cultivated. The exportation of hemp from Aragonia was in 1775, 22,000 cwt. But it is certain, that Spain conſumes at leaſt ten times more flax and hemp than it cultivates, and even this was then not manufactured, being in the habit of purchaſing their linen, ſails, and cordage from France, England, Germany and the Northern Countries. According to Pluce, there has been imported in the year 1765 in Sevilla, foreign linen-cloth to the amount of 1,200,000 dollars (270,000*l.*) In the kingdom of Spain has been imported 24,000 cwt of flax. Since the foundation and eſtabliſhment of the Patriotic Society in Spain, the linen-manufacture is more flouriſhing, and the hemp and flax of their own growth is not only manufactured, but alſo large quantities of imported. In Barcelona has been manufactured, in 1783, linen cloth to the value of thirty millions of reals. But as long as hemp, imported from Riga, with the duty paid thereon, can be ſold at a lower price in Spain, than its own growth, the cultivation will not be cheriſhed, and equal the actual proſperity of the linen manufactories; and notwithſtanding the flax and hemp plant is diſperſed all over Europe, its cultivation is ſtill more proper for the Northern climate.

to decay, becauſe the Kings of Spain firſt granted monopolizing privileges to many convents for the manufacture of Paper; and when it came again into private hands, they fixed ſuch a low price on printed books, of which the Genoeſe availed themſelves, and procured conſiderable quantities of rags from Spain, principally from Andaluſia; and in 1720, they ſent Paper back to Spain to the amount of 500,000 piaſtres. There are at preſent upwards of 200 Paper-mills in Spain, 31 of which are at Alcoi, and Franciſco Guarro manufactures Paper as good as any Dutch.

Peris communicated to Majanſius ſome works of Ariſtotle, tranſlated in the year of the world 5010, from the Arabic, by Moſes Semuel Bar Ichdua Ben Thibun at Granada, which is in the year of Chriſt 1250. The two different ſorts of paper, on which was written in Hebrew, out the Royal Library at the Eſcurial, and ſent by

Majanſius to Meerman, have on examination been found to be white linen-paper; they were written at the end of the reign of Alphonſus the Tenth, and at the commencement of the reign of his ſon Sanctius, between the years 1280 and 1290. But notwithſtanding it is decided by thoſe Antiquarians, to be linen-paper, it differs ſo much in quality and colour from all other paper manufactured in Spain, that it is more probable that it has been copied in later years on imported paper, and the date written thereupon, is by no means a poſitive proof of its antiquity. The moſt ancient linen-paper which can be with certainty traced is of 1367; it is a piece of a manuſcript of *Franciſci Eximii Vita & actis Chriſti*, and is intermixed with ſheets of parchment. It has ſcizzars for a watermark, which was one of the uſual watermarks in Germany and Italy in the fifteenth century.

France made an early uſe of linen Paper, but

but manufactures were later eſtabliſhed there than in Spain and Italy. Lint or flax, was cultivated by the Gauls at an early period; but the clothing with linen became only a cuſtom many centuries afterwards; and the authors of the eighth century quote as a remarkable thing that the holy Segolena was dreſſed in a linen ſhift, and that the Queen of France, wife of Charles the Seventh, was the firſt French Queen who wore ſhifts of linen cloth; which was in the fifteenth century. This is not a proof that no Paper was made of linen before that time. Several authors prove the uſe of linen Paper in 1270, 1294, 1302, 1314, and 1316, but not that it has been manufactured in France, and we have no account for ſeveral centuries what kind of linen Paper was made in that country, which the authors would not have left unnoticed; and therefore no Paper manufacture can be traced before the fifteenth century. Theſe manufactures became in a ſhort time very flouriſhing, and the French

ſoon exceeded their neighbours in the art of making Paper, and were therefore enabled to export conſiderable quantities, which encreaſed ſo much yearly, that in 1658, of thirty-five millions of livres exported in goods and merchandize to Holland, two millions in value were of Paper; and it provided Spain, England, Switzerland, Denmark, Sweden, Ruſſia, but chiefly Holland and the Levant, with Paper for printing and writing. The Paper manufactures in Languedoc, Lioneſe, Guienne, Bretagne, and Poitou work principally for exportation; and the fourteen mills in Alſace, which manufacture about 40,000 reams of Paper annually, export about two-thirds thereof to Switzerland and Germany.

As the French ſtill export a conſiderable quantity of Paper, I think it worthy of notice, to ſtate the names, length, width, and weight of all the different ſorts of Paper, now manufactured in France,

Names.	Length	Width.	A Ream should weigh	And at least
	in. lin.			
Grand Aigle . . .	24 9	36 6	131 lb. and upwards	126lb.
Grand Soleil . . .	24 10	36 0	112 lb. not exceeding 129 lb.	105
Au Soleil	20 4	29 6	86 and upwards	80
Grand Fleur de Lis .	22 0	31 0	70 not exceeding 74	66
Grand Colombier ou Imperial . .	21 3	31 9	88 and upwards	84
A l'Elephant . . .	24 0	30 0	85 ditto	80
Chapelet	21 6	30 0	66 ditto	60
Petit Chapelet . .	20 3	29 0	60 ditto	55
Grand Atlas . . .	24 6	26 6	70 ditto	65
Petit Atlas	22 9	26 4	65 ditto	60
Grand Jesus ou Super Royal .	19 6	26 0	53 ditto	48
Grand Royal etranger	18 0	25 0	50 ditto	47
Petite Fleur de Lis .	19 0	24 0	36 ditto	33
Grand Lombard . .	20 0	24 6	36 not exceeding 40	32
Grand Royal . . .	17 10	22 8	32 and upwards	29
Royal	16 0	22 0	30 ditto	28
Petit Royal . . .	16 0	20 0	22 ditto	20
Grand Raisin . . .	17 0	22 8	29 ditto	25
Lombard	18 0	21 4	24 ditto	22
Lombard ordinaire .	16 6	20 6	22 ditto	20
Cavalier	16 2	19 6	16 ditto	15
Petit Cavalier . . .	15 2	17 6	15 ditto	14
Double Cloche . .	14 6	21 6	18 ditto	16
Grand Licorne à la Cloche . .	12 0	19 6	12 ditto	11
à la Cloche . . .	10 9	14 6	9 ditto	8
Carré, ou Grand Compte, ou Sabre, Sabre au lion .	15 6	20 0	18 ditto	16
Carré très mince . .	15 6	20 0	13 ditto	13
A l'écu, ou moyen Compte, Compte ou Pomponne .	14 0	19 0	20 ditto	15
à l'écu très mince .	14 2	19 0	11 ditto	11
Au Coutelas . . .	14 2	19 0	17 ditto	16

Names.	Length		Width.		A Ream ſhould weigh	And at leaſt
	in.	lin.				
Grand Meſſel . . .	15	0	19	0	15 and upwards	14
Second Meſſel . . .	14	0	17	6	12 ditto	11
à l'étoile, à l'éperon, ou longuet .	13	10	18	6	14 ditto	13
Grand Cornet . .	13	6	17	9	12 not exceeding 14	10
Grand Cornet très mince . . .	13	6	17	9	8 and leſs	—
Champy, ou Baſtard	13	2	16	11	12 and upwards	11
à la Main	13	6	20	3	13 ditto	12
Couronne, ou Griffon	13	0	17	1	12 ditto	10
Couronne, ou Griffon très mince	13	0	17	1	7 and leſs	—
Telliere grand Format	13	2	17	4	12 and upwards	10
Cadran	12	8	15	3	11 ditto	10
La Telliere . . .	12	8	16	0	12½ ditto	11½
Pantalon	12	6	16	0	11 ditto	10
Petit Raiſin, ou Bâton Royal, ou Petit Cornet à la grande ſorte .	12	0	16	0	9 or leſs	8
Les trois O ou trois ronds, ou Genes	11	6	16	0	9 and upwards	8½
Petit nom de Jeſus .	11	0	15	1	7½ ditto	7
Aux armes d'Amſterdam Pro Patria ou Libertas .	12	1	15	6	12 to 13	12
Cartier grand Format, Dauphine	13	6	16	0	14 and upwards	12
Cartier grand Format	12	6	16	0	13 ditto	12
Cartier	11	6	15	1	11 ditto	10
Au Pot, ou Cartier ordinaire . .	11	6	14	6	10 ditto	9
Pigeon, ou Romaine .	10	4	15	2	10 ditto	8½
Eſpagnol	11	6	14	6	9 ditto	8
Le Lis	11	6	14	1	9 ditto	8
Petit à la Main, ou Main Fleurie .	10	8	13	8	8 ditto	7½
Petit Jeſus	9	6	13	3	6 ditto	5½

All ſorts which are leſs than nine inches and ſix lines in length, are permitted to be made of ſuch a width as may be required.

That Paper called *Trace*, *Treſſe*, *Etreſſe*, or *Main-brune*, and of the names *Brouillard*, and *à la Demoiſelle*, and all coloured Papers may be manufactured of ſuch length, width, and weight as ordered.

There are three ſorts of French Paper which are exported to the Levant, that are not above deſcribed:

	Inches.	Inches.	
Aux trois Croiſſans, Façon de Veniſe,	12½ o long,	17 o wide,	20lb. 00z.
Aux trois Croiſſans, ou trois lunes,	12 0	16 0	14 10
Croiſette	11 6 lines,	15 5 lines	9 4

The Papers called *Couronne*, *Cartier*, and *à la Cloche*, if deſigned for the Levant trade, differ from the before-mentioned ſize and weight. In *Savary's Dictionnaire Univerſel de Commerce* are mentioned twenty different

ſorts

ſorts of common Paper, made out of old nets and cords, maculated and blotting Paper, to which the French have likewiſe given different names, but I have omitted them, as they do not contribute to the knowledge of the commerce with Paper, nor to improve and extend our manufactures, which was the motive I had for giving here ſo long a detail; whereas I have endeavoured to abbreviate this hiſtorical account, in other reſpects, as much as poſſible. I will now continue to deſcribe the remaining ſorts of Paper manufactured in France.

Demoiſelle mince is made of the fineſt threads of fiſhing nets, and being more ſtamped in the mill, loſes its natural colour, and becomes of a cinnamon colour.

Demoiſelle forte is leſs ſtamped, and of a dark brown colour.

Joſeph

Joſeph Raiſin, and *Quarré Muſe*, are made of coarſer nets and cords, which are not ſtamped fine. Theſe two ſorts are uſed for packing up the linen cloth at St. Quentin, Beauvois, and Troyes, becauſe their dark brown colour ſets off the whiteneſs of the cloth; and it ſeems that the manufacturers put ſome lamp-black in the engine, to darken the colour.

The Paper, called *Papier à Sacs*, is made of the coarſeſt rags, and is ſold by weight; it is ſurpriſingly brittle, and the manufacturers are therefore ſuſpected of mixing it with ſomething to encreaſe the weight, or it could not be ſo tender.

At the latter end of the laſt century the art of making Paper arrived to a great degree of perfection in England and Holland, ſo that the ſale in France has not ſince been ſo extenſive, and many Paper-mills have been ſhut up, or converted to other purpoſes.

purpoſes. There were, a century ago, in the provinces of Perigord and Angoumois 400 Paper-mills, and now there are not one hundred remaining. But the exportation of Paper from France remains nevertheleſs very conſiderable; and it ſtill manufactures, after England and Germany, the largeſt quantity of Paper of any country in Europe. It exports very large quantities of all ſorts, chiefly that manufactured for Paper-hangings, to the United Provinces of America; for which reaſon, on the 29th of December 1787, the exportation-duty on paper ſhipped for that country was not only taken off, but alſo the exciſe returned. At Montargis is the largeſt paper-mill, erected to work with 30 vats, which would conſume 1,620,000lb. of rags, and 135,000lb. of ſize, but want of water, and the quality thereof, has prevented its working to its full extent. At Vougeot, in Burgundy, is another large mill, with 12 engines and 20 vats, erected by Mr. Deſventes, of which Mr. De La-

lande

lande has furniſhed the public with a complete deſcription, and the drawings of all its parts and machineries.

The printing and writing-papers manufactured in Auvergne are preferred to all other French paper, except that manufactured by Mathieu Johannot d'Annonay, which is principally eſteemed for printing copper-plates. At Thiers are fifteen paper-mills, which bring beautiful writing-paper to the market; and at Ambert, where there are 50 paper-mills, and in Angoumois, principally printing-paper is manufactured, of a very good quality, the moſt part of which is ſold at Bourdeaux, and exported to Holland: it is not ſized, but much ſtronger preſſed. In Limoges are 51 paper-mills, which work 66 vats. In Normandy, and the environs of Rouen and Caen, are numerous paper-mills. The valleys near Rouen provides Paris principally with copy and packing-paper. In the ſmall compaſs of three

three leagues, near Rouen, are 34 paper-mills; and in a circle of 15 leagues, are 20 others. There were formerly many more, some of which were converted in 1748 to other purposes, principally fulling-mills. In the Franche-comté are 27 paper-mills, which work with 30 vats, and are situated on the foot of rocks, where they have a constant supply of clear water; they export their Paper principally to Switzerland.

The paper-manufacture attained to perfection in France much sooner than in Holland and England; which, with the cheapness of labour, gave them a certain superiority in foreign markets, which has gradually diminished, and will remain so, if no new improvements and inventions contribute to its rise. Mr. Robert Lewis in France two years ago discovered a way to make, with one man, and without fire, by means of machines, sheets of Paper of a very large size,

ſize, even 12 feet wide, and 50 feet long. He has obtained a patent *.

In France are ſtill upwards of 500 Paper-mills, which conſume annually 20,000,000 weight

* This improvement in the art of making Paper will occaſion a revolution in that manufacture, and if brought to perfection, enable them to underſell in foreign markets, becauſe three men are now required for every ſheet of paper: if now one man is able to make as expeditiouſly ſheets of ſuch a large ſize, where upwards of 300 ſheets may be cut out, it is of a very great advantage to the manufacturer, who will thereby be enabled to make 900 ſheets of paper with the ſame expence of labour, as he is now obliged to pay for a ſingle ſheet; and moreover he will be able to furniſh perfect larger ſheets of paper, than any other heretofore made, and which is much wiſhed for, for drawing and ſeveral other purpoſes. Mr. Gamble, who arrived in London about twelve months ago, brought over ſeveral ſheets from France, and has obtained a Patent which will in ſome reſpects contribute to the introduction of this improvement in the art of making paper in this country; others have likewiſe for months paſt employed agents in France, to purchaſe ſuch machineries for uſe in this country, and if brought to a greater perfection, there is no doubt, it will be generally adopted and uſed in the Britiſh Paper-mills, and that their commerce will not be injured by this diſcovery in France.

weight of rags and coarſe paper ſtuff. In Franche-Comté it was aſcertained by the exchequer, that 16,000 cwt. of rags were collected within one year, of which 8,000 were manufactured in that county, and 8,000 exported to other counties: as Franche-Comté is only about one twentieth part of France, 320,000 cwt. of rags muſt be annually collected in that country, and upwards of one-third, or 14,000,000 weight are ſtill exported, notwithſtanding the ſevere prohibition.

In Switzerland, eſpecially in the principality of Neufchatel (which belongs to the King of Pruſſia) and in the Cantons of Bern and Baſil ſeveral Paper-mills are now eſtabliſhed, which manufacture very good Paper, admired for its ſtrength and whiteneſs, which diminiſhes the importation from France, and the manufactures at Pontartier. The paper-mill of Mr. Blume, in the canton of Baſil, has gained a ſuperiority

in

in that country, and produces copper-plate paper equal to any manufactured in France.

The time when linen Paper came into uſe in Italy remains likewiſe uncertain; and as all that has come to the knowledge of the preſent time, cannot be ſatisfactorily aſcertained, I will therefore quote only what may be regarded as authentic. The ſenate of Venice granted, the 19th of Auguſt 1366, an excluſive privilege to the Paper-mill at Treviſo, that no linen Paper-ſhavings or offal ſhould be exported from Venice than for the uſe of that mill; if now ſhavings from linen Paper exiſted, it proves the manufacture of that Paper muſt have been eſtabliſhed ſome time before; a document of a notary, in 1367, proves likewiſe the uſe of linen Paper; Maffei ſtates, that he is in poſſeſſion of a family manuſcript of linen Paper, written in 1367, and he attempts therefore to appropriate the invention of linen Paper to Italy, notwithſtanding

it appears more likely, that by the manufactures of cotton paper, the linen paper has not been manufactured in Italy at ſuch an early period. In 1374 the patent of the manufacture at Treviſo, which proved ſucceſsful, was renewed by the ſenate of Venice. An extenſive commerce in Paper was carried on at Venice for exportation. The city of Gorlitz received, from 1376 to 1426, all its Paper from that country.

Angelus Roccha mentions a Paper manufacture at Foligni, exiſting in the 16th century; and he ſays, that at Fabriano was manufactured the beſt large Paper; and at Foligni, the beſt Paper of a ſmall ſize. The Paper-mills at Fabriano are yet in eſteem, and there are the greateſt number in Italy. In the Pope's territory at Tivoli, Viterbo, Ronciglione, Bracciano, and Rome, are many Paper-mills, but they do not make ſo much Paper as they might, from the quantity of rags gathered in that country; and Schlozer

ſtates,

ſtates, that one million in weight is annually exported to Genoa. The value is entered at 100,000 ſcudi, or crowns.

Venice exports large quantities of Paper to the Levant,* and inferior aſſortments to the Auſtrian dominions: at Colli, in Tuſcany,

* The commerce of Paper to Turkey is principally carried on at Venice: the aſſortments are white, thick, and very cloſe: the Turks cannot make uſe of any weaker Paper, becauſe they uſe a reed for writing, which is cut into the form of a pen. Thoſe called *fioretto* and the *three moons* are in the greateſt requeſt, being very ſtrong and very heavy. The *fioretto* is the moſt faſhionable kind of Paper, and the deareſt. The Turks gum it, and brighten it with a poliſhing-inſtrument.

Next to Venice, Genoa is the place in Italy which exports the greateſt quantity of Paper to the Levant. The Genoeſe Papers are much lighter and not ſo dear as thoſe of Venice: they are made uſe of in winter inſtead of window-glaſs, for œconomy.

Upon the whole, Italy ſends Paper into Greece to the amount of 25,000*l.* and into Turkey to the amount of 250,000*l.* *which ought to be noticed by our merchants and Paper-manufacturers*, and engage them in a competition with the Italians in this important branch of the Levant trade, principally as Marſeille has been, of late years, the only place in France that can circulate any of its Papers in Turkey.

Tuſcany, is a mill which manufactures very good Paper. In the environs of Turin are ſeveral mills which furniſh fine Paper; one Paper-maker in Venice is in poſſeſſion of the ſecret of covering his Paper with a varniſh, by which means the writings can be eaſily obliterated with a ſponge, and he has found an extenſive ſale for this Paper. The Genoeſe had ſome time ago monopolized the Paper-trade of Italy, by manufacturing it of a ſuperior quality and whiteneſs, and by uſing a particular ſize, which it is ſaid prevented its deſtruction by moths; but this commerce is now greatly reduced.

Germany diſputes with Italy the moſt ancient knowledge of cotton and linen Paper. There were already in the 13th century cotton and linen manufactories eſtabliſhed, which exported large quantities of goods to Italy and to the Levant; and it cannot therefore be ſurpriſing that the art of inventing linen-rag Paper

is

is judged to belong to Germany: but nothing has been aſcertained with certainty. The ſeveral ancient manuſcripts and pieces of linen Paper preſerved in Germany do not poſitively aſcertain that the firſt manufacture was eſtabliſhed in that country. There have been always quoted two diplomas, to prove the age of the uſe of linen Paper in Germany; the one is of Count Adolphus the Fourth, of Schaumburgh, who therein confers in 1239 on Rinteln the right and privileges of a city, and which has been made known to antiquarians by Profeſſor von Peſtel at Leiden; the other is of the year 1303, which Profeſſor Popowitſch at Vienna declares to have ſeen in the archives of the city of Windiſchgraetz in 1740. Both diplomas would be miſleading others, if accepted as proofs of the antiquity of linen Paper in Germany; that at Windiſchgraetz is only quoted by memory, and the other of Rinteln is ſtill more

ſuſpicious, and wants the day and month when executed, which is found in all other diplomas given by the ſaid Count Adolphus, and according to Spangenberg and Bierling, Rinteln did not receive the right and privileges of a city till the year 1340, which is 101 years later. But one piece of Paper, of 1308, which Mr. von Senkenberg ſent, in 1763, to Mr. Meerman, merits particular attention; it was ſtrong, white, pliable, and had the marks of the wire-moulds, which are the tokens of linen Paper; it was nevertheleſs glazed, and much reſembled parchment, which are tokens of cotton Paper. The Royal Society of Sciences at Gottingen judged therefore, if the date could be taken as certain, that the epocha could alſo be taken for the true time when linen Paper was invented, notwithſtanding Profeſſor Murray believes it to be mixed Paper, of linen and cotton, manufactured at Fabriano. If it ſhould be linen Paper manu-

manufactured in Germany, it muſt have been, according to their opinion, on the frontiers of Italy.

Von Stetten is of opinion that linen Paper was manufactured at Augſburgh earlier than in any other part of Germany. That city was the firſt which eſtabliſhed conſiderable linen-manufactories, and carried on in ancient times an extenſive commerce in linen. Nevertheleſs, the eſtabliſhment of mills cannot be aſcertained, nor the preciſe time when the firſt paper-mill was built on the Sinkel-ſtream. Longolius at Hoff endeavours to eſtabliſh it as a fact, that linen Paper has been made at Augſburgh at the commencement of the fourteenth century, by a diploma in the archives of the Prince of Onolzback, by the Biſhop Frederick of Augſburgh, which is without date, and it ſtates that the ſaid biſhop was of the houſe of Speet von Thurnegg, who reigned between the years 1307 and 1330, that the

Paper

Paper muſt therefore have been manufactured within or before that period. This diploma is, on the ſtricteſt examination, declared to be Paper made from linen; but Meerman ſtill retains his doubts, becauſe another Biſhop of the name of Frederick reigned in Augſburgh in 1414, and that there are yet exiſting in Augſburgh publick accounts up to the year 1330 all on cotton Paper, in which repeatedly expenſes are brought in *pro papyro*, without mentioning if for linen or cotton Paper.

That Pomerania had an early knowledge of Paper, has been ſatisfactorily proved by John Samuel Heringen, Profeſſor at Stettin. He quotes a long liſt of ſignatures of the notaries to certify numerous diplomas from the Dukes of Pomerania, between the years 1263 and 1373. But we cannot take him for a ſufficient judge of linen and cotton Paper, and therefore not deciſive in opinion. A copy of a document of 1289, written in

1315

1315 in monkiſh characters, containing a donation from Biſhop Hermanzus to the convent of nuns at Coſlin, has the water-mark of a bull's head with a croſs on the top of a pike, raiſed between the horns; and Heringen believes, that this water-mark is an undeniable proof, that this Paper was made in Pomerania, in the dioceſe of the Biſhop of Camin, and that the ſign of the bull's head muſt be the arms of the family von Wachold, and that the croſs is the ſign of the biſhop. But this opinion muſt be erroneous, even if we admit the water-mark to be a proof in what country the Paper has been made. The bull's head is the arms of Mecklenburgh, and the German princes are jealous of permitting their arms to be uſed by any branch of the nobility, not belonging to their own houſe. The water-mark, in the firſt invention of linen-paper, may have ſignified in what parts the Paper has been made, but has been ſince uſed to diſtinguiſh the quality

of

of the Paper, or in which mill it was manufactured.

The water-mark of a bull's head in the Paper, which is not in any Italian Paper, and which ſcientific men take as an undeniable token of books printed in the firſt printing-office of Fauſt, is only the firſt water-mark made in the moſt ancient German linen Paper, and is found in all ancient German manuſcripts, and the firſt printed books, with ſome alterations and additions: the firſt manufactured Paper of Germany is of the year 1312, with the water-mark of a plain bull's head, which may have been ſince adopted by Paper-makers of other countries, as it is ſtill in practice with many ſorts of Paper that are in great demand; for example, the words *Pro Patria*, which are water-marks in Paper like our foolſcap, originated in Holland, but it is likewiſe made uſe of in French and German mills; and if the ſign of a bull's or bullock's head, which

which are truly the arms of Mecklenburgh, is to be taken as a proof that the firſt Paper was made in that country which uſes theſe arms, then is Mecklenburgh entitled to the honour of this diſcovery. This is ſupported by the ſituation of Mecklenburgh being on the frontiers of Pomerania.

In the archives at Wolgaſt is a document on linen Paper of 1393. In that of the hoſpital at Kaufbeuren are two of 1318, and in the archives of the city ſeveral others of 1324, 1326, and 1333. Von Murr found in Nuremberg linen Paper of 1319. The moſt ancient linen Paper preſerved in the Netherlands, is the copy of a Bible in verſe, by Jacob Maerlant, in the library of Iſaac le Long, which Meerman ſaw and examined, when the library was ſold by publick auction at Amſterdam, in 1744. A manuſcript in Dutch, "*Het boek der Byen*" of 1330 written on linen Paper, is in the library of Hulſian. At Hohenloe is a

document

document written in 1333, on the Friday after the Aſcenſion. In the convent at Quedlinburgh is a bill of feoffment, granted by the Emperor Charles the Fourth, to the Abbeſs Ermingarde in 1339. Bohuſlaus Balbinus aſſerts that in the archives at Prague are preſerved ſeveral diplomas written before 1340, which have induced many to believe that the firſt linen Paper was made in Bohemia. In the library of the Minſter at Fulda, are preſerved with the manuſcripts and letters of celebrated men, ſome *Decreta Judicialia* of the ancient abbots from 1341 to 1491, all written on linen Paper and with ſeals. John Daniel Fladd in Heidelſberg diſcovered ſeveral documents written on linen Paper in the fourteenth century, the moſt ancient of which was in 1342. The Royal Society of Sciences at Gottingen adjudged to him a prize-medal of 25 ducats, for the diſcovery of the moſt ancient linen Paper. Helmſtadt has exhibited a document of 1343; it is a little deed of an

acre

acre of land, which a prieſt of Helmſtadt purchaſed, and on which are two ſeals; and as he was in fear for the laſting of his document, the Paper being ſo thin, he applied to the magiſtrate for a duplicate on parchment, which is only two years younger. In the archives at Plaſſenburgh is a record with a ſeal, dated 1347; and at Magdeburgh are ſeveral of 1350. Qualenbrinck at Utrecht diſcovered, in the bailiwick of Utrecht, three documents of the Teutonic order, two of 1353, and one of 1369. Fladd diſcovered another document on linen Paper of 1377, on the back of which is a wax ſeal; the Paper is rough, and the water-marks very plain. Gatterer at Gottingen found in the family archives of Holzſchuher at Nuremberg a linen Paper document, with the ſeal on wax of Frederic Holzſchuher, Knight of the Teutonic Order. The library of Paulin at Leipzig poſſeſſes a manuſcript of the poet Hugo Trimberg, written in 1391.

It ſeems, by the numerous relics of ancient linen Paper in Germany, that it came into uſe there at the beginning of the 14th century, and Ulman Stromer of Nuremberg, who died in 1407, began in 1360 to write the firſt work ever publiſhed on the art of Paper-making, and eſtabliſhed a large Paper-mill in 1390. He employed a great number of perſons, amongſt whom were three Italians, Franciſcus, Marcus de Marchia, and Bartholomæus; all of them were obliged to make oath not to teach any perſon the art of Paper-making, or to make Paper for their own account. He employed another perſon of the name of George Thirman, who bound himſelf only for ten years. In the firſt year he employed two rollers, which ſet eighteen ſtampers in motion; but when he would in the ſecond year add another roller, he was oppoſed by the Italians whom he employed, who would not conſent to the enlarging of his manufacture; but they were impriſoned by the magiſtrates,

magiſtrates, and then they ſubmitted by renewing their oaths.

All the Paper-mills erected, ſince the art of printing has been invented by Koſter, of Haaerlem, in 1430, cannot be brought forward as a teſtimony to prove the invention of linen Paper-making in Germany; but, after the noble invention of printing (by which ideas can be ſo eaſily conveyed and diſperſed) came in practice, the rapid extenſion and the multiplication of printing made the increaſe of Paper-mills neceſſary. In the environs of the Rhine, in Swabia, Franconia, Alſatia, Miſnia, and Bohemia, are the greateſt number of Paper-mills. In the Hanoverian dominions are 34, and Beyer ſtates that there are in Germany 500 Paper-mills* (thoſe in Auſtria and Pruſſia not included), which manufacture at leaſt 2,500,000

* I ſubjoin here an account of ſome Paper-mills in Germany, as far as I could obtain knowledge thereof.

2,500,000 reams of Paper. According to Count

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1. In the Circle of Upper Saxony, in the Chur-Mark	4
Chur-Saxony	80
Swediſh-Pomerania	2
2. In the Circle of Lower Saxony, in the Hanoverian Dominions	34
Mecklenburgh	6
Near Hamburgh	2
3. In the Circle of Weſtphalia, in the Principality of Minden	1
County of Lippe	6
Abbey of Werden	3
County of Tecklenburg and Linden	3
In the Circle of the Upper Rhine, in the County of Iſenburg	2
Catzenellenbogen	2
Hanau-Münzenberg	1
5. In the Circle of Franconia, in the County of Henneberg	3
6. In the Circle of Suabia, near Augſburg	4
Ulm	1
7. In the Circle of Bavaria, near Regenſburg	1
8. In Bohemia	81
9. In Sileſia, in the Environs of Hirſchberg	4
Sagan	2
Wartenberg	2
Schweidnitz	12
Which amount to	256

It is therefore apparent that there muſt be more than 500 Paper-mills in Germany.

Large

Count Ewald von Hertzberg, there were, in 1785, in the Pruſſian dominions 800 Paper-manufactures, the revenue thereof produced 200,000 dollars annually.

Large ſums of money go notwithſtanding from Germany to foreign countries, for the purchaſe of Paper, becauſe the Paper-makers make in general coarſe Paper chiefly for printing, and the finer ſorts and writing-paper are imported. In the port of Hamburgh were imported, in 1782, 7,439 bales (of 10 reams and upwards,) 4,336 reams, four caſks, and three cheſts, with Paper. That city has no more than two Paper-mills, of two vats each, which conſume 6,000 cwt. of

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Large quantities of Paper-materials are loſt in Germany, becauſe the coffins in which they lay the deceaſed are filled in the moſt part of Germany with Paper-ſhavings; the bodies are likewiſe clothed with a linen ſhift or ſhirt, and are laid on a linen ſheet.

Confiſcated books are burnt in Germany.

of rags, and make principally dark purple paper for the ſugar-bakers The annual increaſe of printing preſſes, and the want of rags and Paper-ſtuff, has engaged the Paper-makers to make many more reams of Paper from one cwt. of rags than formerly, which renders the preſent German printing-paper very diſagreeable to the printers and readers.

There are in the kingdom of Sweden no more than 24 Paper-mills. In Stockholm alone were imported, in 1781, 18,579 reams of Paper: 8,142 reams for writing, 5,786 reams for printing, and 4,651 reams of packing-paper, and coarſer ſorts.

When the Czar, *Peter Alexiewitz*, viſited Dreſden, in the year 1712, he ſaw the Paper-mill belonging to Mr. Schuchart, and made a few ſheets of Paper with his own hands; he was ſo pleaſed with an art which ſurpriſes every perſon who viſits a Paper-mill for the firſt time, that

he

he immediately engaged Paper-makers, whom he ſent to Moſcow, to eſtabliſh Paper-mills at his own expenſe: and Mr. Pfeiffer, a German, erected, with the aſſiſtance of a carpenter from Commothau, a very fine Paper-manufactory; to which the ſaid Emperor granted great privileges. At Jaroſlow is now a Paper-mill, with 28 engines and 70 vats, which manufactures weekly 1,100 reams of Paper, and conſumes annually 800 tons of rags; and another which works 13 vats by 13 engines: they chiefly make Paper for Paper-hangings, which they ſell at Moſcow. There are 23 Paper-mills in the Ruſſian empire, and, notwithſtanding they are not in want of rags (the exportation of which is prohibited), they import annually Paper to the amount of 220,000 rubles. *

In

* The duty to be paid on imported Paper is as follows: for writing-paper, from 2 to 5 rubles per ream; coloured Paper from 2 to 4 rubles; blotting-paper, 3 rubles; all

In the government of Kaluga are ſeveral Paper-mills; and, according to Waſilii Szujew, all offal from preparing and weaving hemp and flax, with the ſpoilt yarn in the linen and ſail-cloth manufactories, are delivered to the Paper-mills.

At the commencement of the preſent century there were very few Paper-mills in Holland, and the Dutch imported great quantities of Paper till 1723 from St. Malo, Nantz, Rochelle, and Bordeaux; but, ſince that time, they have erected numerous mills, and carried on an extenſive commerce, which has ſuffered greatly ſince that country has been governed by the French Republic. In the province of Holland

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Paper uſed for making cards, 3 rubles; royal, 1 ruble 60 copecs, to 2 rubles; ploughed letter-paper, in quarto, 1 ruble 35 copecs; and if with gilt edges, 1 ruble 80 copecs; printing-paper, 75 copecs; paſte-boards for the uſe of manufactures, 60 copecs for a hundred.

Holland were, in 1770, eleven large and conſiderable Paper-mills. In Gelderland are a great many, but ſome ſo ſmall that they are only able to make 400 reams of Paper annually: and there are alſo water-mills with ſtampers, like thoſe in Germany. But in the province of Holland there are wind-mills, with cutting and grinding engines, which do more in two hours than the others in twelve. In Saardam, a thouſand perſons are employed in Paper-making. Holland produces not one tenth of the quantity of rags uſed in that country for Paper-manufacturing, which are ſmuggled in from France, and imported from Germany, Italy, and Portugal; the latter of which are of the coarſeſt kind. The Dutch are chiefly jealous with reſpect to this manufacture, and the exportation of moulds is prohibited under pain of death. They export large quantities of Paper, principally dark purple, to Hamburgh. From 20 to 30,000 reams are annually exported to

Sweden; and the exportation to France, England, Denmark, and Ruſſia, is not inconſiderable, becauſe they manufacture ſome ſorts ſuperior to thoſe manufactured in other countries.

I conclude by obſerving, that they chiefly manufacture writing-paper, and Paper of a dark purple colour, for packing ſugar-loaves. For their own printing-preſſes, they purchaſe Paper from France and Germany.

We are obliged to Mr. Meerman's indefatigable perſeverance for knowing that in 1308 linen Paper was uſed: the diſcovery of this invention may have been made ſome years ſooner, but the preciſe period cannot be poſitively aſcertained; nor in what country this invention originated.

In Italy is preſerved linen Paper, of 1367,

1367, and in Spain, of the ſame year; in England, of 1342; in France, of 1314; and in Germany, of 1308; it is therefore likely, that Germany has the honour of its invention.

Ducarell ſtates in his letter to Mr. Meerman, that, in England, many documents from the year 1282 to 1347 are preſerved; but he acknowledges that it is impoſſible to aſcertain, whether theſe manuſcripts are written on Paper made from linen, without any mixture of cotton. Prideaux quotes a regiſter of acts from John Cranden, of the 14th year of the reign of Queen Elizabeth, written on linen Paper in 1320; but it has been determined, that, in many inſtances, he had not a competent judgment to aſcertain the true quality. Mr. Aſtle, who wanted neither knowledge, nor the opportunity of making more effectual inquiries, is ſilent as to the time when the linen Paper came into uſe in England; all that he

remarks

remarks is merely a repetition of what Prideaux has ſtated. There is in the library at Canterbury, according to the Philoſophical Tranſactions of the year 1703 (No. 288, page 515), an inventory written on linen Paper, ſpecifying the inheritance of Henry, who was prior of Chriſt-Church, and died in 1340. Dr. Wendeborn ſtates, that, in the Britiſh Muſeum, there are pieces of linen Paper from the Cottonian library, written in the reign of Edward III. in 1342; and he believes that if the manuſcripts which it poſſeſſes were carefully examined, there might be found others of a more ancient date.

As nothing farther has yet been aſcertained, or come to public knowledge, we muſt take theſe manuſcripts of 1342 for the oldeſt proof of the period when linen Paper came into uſe in England.

The art of manufacturing Paper from linen

linen and linen-rags was only eſtabliſhed in England in the latter part of the 16th century. All Paper uſed before that time was imported from Holland and France, and ſhe paid, ſo lately as the year 1663, 100,000*l.* to the latter country, for imported Paper. A German, of the name of *Spielman*, had the happineſs, under the reign of Queen Elizabeth in 1588, to erect at Dartford, in Kent, the firſt Paper-mill; for which he received from her Majeſty the honour of Knighthood.

It is recorded in the Craftſman, No. 910, that King William III. granted the Huguenots from France, refuged in England, (Biſcoc and others,) a patent for eſtabliſhing Paper-manufactories; and parliament granted to them other privileges: but, from a want of unrelaxed perſeverance, œconomy, and induſtry, their undertaking met with the fate that often attends new eſtabliſhments: it went to ruin, notwithſtanding

ing its ſucceſs in the firſt few years; and the manufacture of Paper in general decayed, until the year 1713, when Thomas Watkin, a ſtationer in London, brought it in a ſhort time into great repute and perfection; and it is a merit attributable to him, that the preſervation of this important, moſt uſeful, and neceſſary of all arts has given riſe to the eſtabliſhment of the numerous Paper-mills that England now poſſeſſes, which manufacture very large quantities of Paper of all ſorts in the greateſt perfection: not only a great part of which is exported to foreign countries, but the importation of this commodity is now confined to a few aſſortments only, of which there cannot be a doubt, that theſe kinds of Paper yet imported, will ſoon be manufactured in this country of an equal quality, becauſe, by perſeverance, convenience in the conſtruction of theſe manufactures, ſuperior engines, preſſes and machines, and improved moulds, the induſtrious manu-

manufacturers have been aſſiſted and enabled to give to Engliſh Paper its actual pre-eminence.

Ireland has, during many years, offered and paid premiums to encourage thoſe concerned in Paper-making, for the manufacture of the beſt and the largeſt quantities of Paper; but notwithſtanding ſuch incitement, and that proviſions and labour are there cheaper than in England, it is under the neceſſity of importing conſiderable quantities from hence, and paying a higher price than for their home-manufactured Paper.

Scotland manufactures good printing-paper, which greatly ſurpaſſes that of the Germans in whiteneſs and ſtrength.—Meſſrs. Foulis, printers at Glaſgow, are ſaid to export annually on an average two millions of copies of books, and it muſt be preſumed that they are partly indebted

debted to the ſuperiority of the Scotch Paper, to that of Germany and the Northern countries, for the pre-eminence to which their printing-houſe has been raiſed.

England, which does not furniſh ſuch conſiderable quantities of rags as might have been expected from the number of its inhabitants, and their ſuperior cleanlineſs in linen, notwithſtanding, conſumes at preſent, in its extenſive and numerous Paper-mills, as many rags as any other country in Europe, Germany and France excepted. The revenue ariſing from the exciſe-duty on Paper amounted, in 1799, to 140,000*l.* If we now calculate that ſix-fifteenth parts of the whole quantity of Paper made in England is writing and printing Paper, which pays 2½*d.* per pound exciſe-duty;* that five-fifteenths

* Since the above was written, the duty on Paper has been doubled, and commenced in April 1801.

fifteenths are of the ſecond claſs of Paper, paying 1*d.* per pound; and that, of the remaining four-fifteenth parts, one-half pays a halfpenny per pound, and the other half nothing; we find that 24,000,000 pounds weight of rags and other Paper-ſtuff is annually manufactured into Paper.*

One reaſon that may be aſſigned is, that they are not ſo carefully gathered as in other countries; but another and more powerful one is, that the greateſt part of the English families are able to live more comfortably than the people of other countries, and think the ſaving of rags not worth their notice, or think them of ſo trifling a value, that a great part is burnt or deſtroyed. But, as I have before ſtated, that the Britiſh nation is in part indebted for their wealth, and pre-eminence above all other nations, to the manufacture of Paper, and the art of

* The importation of rags from the continent, in 1799, was 6,307,117 *lb.*

of printing, writing, and drawing; and as it is certain, that the quantity of Paper manufactured in England is the next to that of wool, cotton, and linen, and employs not only many thousands of hands in the mills, but gives bread to ſtationers, authors, printers, bookſellers, and bookbinders, which are ſo numerous with their dependents, that it may be taken for granted, that this manufacture gives livelihood to a greater number of perſons than any other; every head of a family ſhould therefore conſider this branch of commerce and revenue as a national concern, and follow the example of the Dutch families, who lay by all old rags clean waſhed, and ſell them aſſorted annually to the agents of the Paper-mills: and there can be no doubt but the ſaving of rags and waſte Paper in England would equally contribute to the advantage of this valuable manufacture.

By the act of parliament, which prohibits, under

under a penalty, the burial of the dead in any other dreſs than wool, may be ſaved about 250,000 pounds weight of linen annually*; which in other countries periſh in the grave: but this is of little conſequence relative to the great conſumption of rags, and does not form more than one hundredth part.

The want of this article obliges us therefore to import the quantity required for our mills from abroad, until other ſubſtitutes can be converted to anſwer the purpoſe of rags: till thoſe are brought to perfection and generally adopted: and until the Paper manufactured thereof is univerſally protected, by every well-wiſher to his country. The value of the Paper manufactured in 1784 in England has been ſtated to amount to 800,000*l.* and it will not be over-rated

* Calculating that out of thirty perſons living, on the average, one dies annually, and that one pound weight of linen might be uſed at every burial, and the number of inhabitants ſeven millions and a half.

if we give the preſent annual value, by reaſon of the increaſe of the uſe of Paper and of its price, at one million and a half ſterling; which, after it has gone through the hands of the ſtationers, and is finiſhed by the authors, artiſts, engravers, printers, and bookbinders, and put up for ſale by the book and print-ſellers and ſtationers receives ſuch additional value, that its amount may be eſtimated at ſome millions more.

Parliament has therefore, for the ſupport of this manufacture enacted, that rags, old nets, and ropes (which are uſed for manufacturing paſte-boards, wrappers, and packing-paper), can be imported duty free; and laſt ſeſſion, it likewiſe allowed the free importation of all waſte-paper, provided it is torn into pieces ſo that it cannot be uſed otherwiſe than for being re-manufactured. Theſe meaſures will in ſome degree aſſiſt the Manufacture recently eſtabliſhed for that purpoſe; but notwithſtanding cannot ſuffi-

ciently

ciently obviate the lamentable ſcarcity, and greatly reduce the price of rags and other paper-ſtuff: the conſumption of the Paper manufactured of the latter materials (old nets and ropes) has likewiſe increaſed very much, and muſt be the more conſiderable as the commerce of this country is extended.

Theſe circumſtances, and the eſtabliſhment of the *Regenerating-Paper-Manufacture*,* brought to my recollection what Bruyſet, Levier de Liſle, Fonde, Gleditch, Greaves, Guetard, Klaproth, Linnæus, Clarus Mayer, Reaumur, Schäffer, Seba, Stakel, Strange, and other ſcientific men had noticed, and their ideas on ſubſtitutes for paper-materials. Theſe authors have ſtated, that as cotton, flax, and hemp, are the origin of paper

* The re-manufacturing of Paper has been long practiſed by the Chineſe; and there is, in one of the ſuburbs of Pekin, a conſiderable Paper-manufacture for that purpoſe, which gives employ to numerous perſons who collect waſte-paper, which is purchaſed at a low price.

and rags, other vegetables of a tender and pliable nature might probably be converted into a mucilaginous pulp, and adopted as a substitute for rags in the manufacture of Paper; and farther, that thoſe vegetables that are of a brittle and harſh nature, but which can be obtained in large quantities and at moderate prices, might by art and perſeverance be made tender, without deſtroying that quality which is neceſſary to be retained in paper-ſtuff. It is a grand *deſideratum*, that theſe ſuggeſtions ſhould be brought into effect; and it is ſurprizing that the obſervations of the authors above quoted ſhould not have been earlier attended to by ſcientific men, or rather by intelligent Paper-makers, who had the road thus opened to them for their inveſtigation: for, ſhould any man have diſcovered a commodity, which could be cheaply and plentifully ſupplied in this country, as a ſubſtitute for rags, &c. to mould unexceptionable Paper, ſuch a man would amply merit the approbation and

encou-

encouragement of the public, notwithſtanding *the jealouſy* of thoſe, who are acquainted with, and followed the hints of the above-mentioned authors, but failed in the ſame purſuit.*

Dr. Schäffer, it is true, worked with perſeverance, induſtry, and ardour, to prove that numerous vegetables were qualified to make Paper, and his fame will be immortalized;

* Many hints have been given by others, and principally by an ingenious literary gentleman, long reſident in India, to J. Sewell, of Cornhill, on the uſefulneſs of many Eaſt-India plants, not only for making Paper, but likewiſe for the manufacture of linen cloth, ſail cloth, and cordage; but they have not yet been attended to, notwithſtanding Mr. Sewell has neither ſpared expenſe nor trouble to propagate theſe hints. Shall now a perſon who purſues ſuch hints, and is by perſeverance ſucceſsful, in making uſeleſs articles valuable in manufactures and commerce, for the benefit of his country, not be entitled to merit, and the ſupport of the publick, becauſe the firſt idea has been communicated to him by others? Linen cloth has been manufactured from flax during ſeveral centuries, before the art of making fine lace of the ſame ſubſtance has been diſcovered: this improvement was nevertheleſs conſidered as a new invention

lized; but, notwithſtanding that this author theorized on the ſubject with great ability, he accompliſhed nothing ſatisfactory by his experiments, which only tended to prove that various vegetables could probably be ſo mollified as to make uſeful Paper with the addition of a ſmall quantity of rags: neither himſelf, nor any perſon who has followed him, has ever been able to make it at all without rags, or, even by mixture, fit for printing, writing, paper-hanging, and other purpoſes: it has only been fit for packing paper, and always brittle.

Travellers affirm that the Chineſe and Japaneſe uſe a lye in their Paper-manufactories, by which they convert plants, the bark of trees, and ſeveral other vegetables, into a pulp,* which is afterwards moulded into a large and beautiful Paper: this Paper, however, notwithſtanding its apparent ſmoothneſs,

* All Paper made in the province of Che-Kyang is manufactured from the ſtraw of rice and other grain.

neſs, is very liable to break. No author has ſatisfactorily deſcribed the ingredients that are uſed in making this lye, or the farther proceſs that vegetables muſt undergo, before they are ſufficiently macerated and reduced to a ſtate to be formed into Paper: and all farther information has been cautiouſly concealed from us.

Nature, which is ever bountiful in ſupplying all our wants, has not only provided us with numerous materials for making Paper, but alſo ſhewn us in what manner vegetable ſubſtances may be formed into Paper, by the operation of Nature itſelf, of which G. A. Senger at Reck has given us knowledge in his *Moſt Ancient Record of the Fabrication of Paper, diſcovered in Nature.* It is the plant which has received the name of *conferva* from Linnæus and other naturaliſts who followed Pliny; which is to be found plentifully on the top of the water in brooks, rivulets, ponds, ditches, &c.

Men

Men are little inclined to aſcribe their knowledge to any other cauſe than to their own inveſtigation, and moſt diſcoveries have therefore, by manifold and exquiſite improvements, obtained, by our genius, the appearance which might lead us to conſider all the perfections to which arts, ſciences, and manufactures are arrived, as if they had been invented and brought into exiſtence entirely by ourſelves, without the aid of various accidental occurrences in the œconomy of Nature. All theſe diſcoveries nevertheleſs derive their origin from nothing elſe but the appearances in Nature, and men are conſequently but the imitators of Nature, although in the moſt laudable ſenſe.

This would require a more particular and more extended inveſtigation than I am willing to deliver; and an expert philoſopher would only be fit for ſuch an undertaking, in order to ſuppreſs the prejudice and ſelf-conceit of thoſe who appropriate their

their inventions alone to their own extended wiſdom; and to exhibit men in their feebleneſs, being entirely dependent on Nature.

Nature, which lays open to every eye, is the moſt excellent ſchool of all for acquiring wiſdom; ſhe forms the philoſopher, and is the firſt channel by which the artiſt and chemiſt obtain knowledge and ability; an aſtoniſhing light ſtreams forth from the active ſtage of Nature into our organs, and her aim is to promote, ſtep by ſtep, decency and perfection in the moral world, if attended to, comprehended, and properly applied. It appears, therefore, ſtrange to the ſtrict obſerver of the phenomena of Nature, why ſo many of our arts have not been ſooner diſcovered and brought into practice.

I do not look for theſe cauſes in the myſteries wherein Nature often cloaks her work, but rather in man himſelf, and in

his remiſſneſs, often occaſioned by circumſtances, and owing to the little attention he is accuſtomed to give to her phenomena.

Many of our learned men, in order to rectify and enlarge their ideas, confine their diligence and obſervations only to their books, neglecting to caſt a penetrating eye on the ſecret and active operations of Nature; and a man of a ſearching ſpirit may be ſometimes miſled to aſpire to ſupernatural things, and live and act in the ſpeculations of an imaginary ſphere, and leave, according to his imagination, the lower regions to ideots. Nature is the beſt teacher: the information obtained from books muſt be conſidered as ſecondary; and hints given to an active mind can only be brought to perfection by combining the inſtruction received from books with thoſe which we obtain from Nature in greater perfection. To this we muſt join the inclinations which ſeem to be natural to us,

that

that we ſcarcely look for things of importance in our proximity, but are rather inclined to ſearch for them at a diſtance. Theſe are undeniable grounds why many hints for valuable diſcoveries have not been brought to perfection and practice.

Mr. Senger ſtates that he became unexpectedly acquainted with the natural preparation and fabrication of Paper. He ſays: " In my walks on the borders of a ſmall " brook, I found both ſhores on the ſide " of the hedges covered with a ſlimy " ſubſtance, which the not long be- " fore overflowed brook had depoſited. " The ſurface of the water was covered " anew with a yellowiſh green vege- " table, and in ſuch places where the " brook had bendings, lay conſiderable " quantities of this fine vegetable produc- " tion piled up in heaps, which gave addi- " tional beauty to the blooming ſhores of " the flowing brook. This appearance,

" and

" and the thought of an uſeful application,
" attracted me into their intereſt, and de-
" termined me to examine it without de-
" lay, in order to diſcover its value, becauſe
" I could not perſuade myſelf that thrifty
" Nature could have brought forth ſo much
" beauty and ſuch an aſtoniſhing great
" quantity of fleecy matter to no uſe or
" purpoſe.

" This vicinity was for many days the
" place of my reſort, and the little brook
" appeared to me to be a rich fountain,
" which concealed plenty of matter to in-
" creaſe knowledge, which might lead to
" ſome new diſcoveries, and in courſe of
" time recompenſe my endeavours with
" the moſt pleaſing ſurpriſe.

" This covering extended on the ſurface
" of the water, was not only a reſting-
" place for inſects of various ſorts, and a
" well ſecured ſtore-houſe for their broods,

but

" but as Nature intends every where to
" give multiplicity of advantages, I ex-
" perienced very ſoon that it contained a
" proper ſtuff for making Paper, and what
" is more ſurpriſing, a Paper prepared
" by Nature alone, without the aſſiſtance
" of imitating proceſſes.

" This peculiar web contains innume-
" rable fleecy parts of vegetation, which
" are generated, in the firſt part of the
" ſpring, on ponds and other ſtanding wa-
" ters; they detach themſelves from the
" bottom, and riſe on the ſurface, where
" they appear as a handſome green and
" yellow covering. After theſe fleecy
" particles have remained for ſome
" time on the watery mirror; by the
" heat of the ſun, and by the changing
" degrees of cold and warmth of the wa-
" ter, they become more united and felted
" together, bleached, and at laſt turned
" into a tough Paper-like covering. Or,

if

" if this fleecy ſubſtance is mixed together,
" and carried away by ſudden inundations,
" occaſioned by heavy rains, and depoſited
" on the ſhores, it appears then like a thin
" jelly or ſlime, which, after it has under-
" gone ſeveral changes naturally produced
" by the contents of air and water, turns
" into a kind of Paper, which reſembles
" the common Paper; or, where it has
" been produced upon clean water, it is
" not unlike a ſuperior Paper, of which
" ſome may be gathered nearly as white
" as writing Paper."

Muſt we not, with humble ſubmiſſion, ſtill more revere the hand of the all-wiſe Creator in the works of Nature, when we find that ſhe proceeds in this operation in the ſame manner as the Paper-maker in his mill, when he attempts to prepare Paper out of rags. This fleecy ſubſtance riſes from the bottom of the water, and ſeparates from its origin and vegetation, which is the

firſt

firſt proceſs; theſe materials are then prepared upon the ſurface of the water by the apparently inviſible contents of all waters, which are in ſome more, in others leſs; by the ſofteſt of all waters, rain; by the refreſhing air of the night; by the heat of the ſun; and by glutinous and oily ſubſtances. The waves or motion of the water reduces it into the ſmalleſt particles, without deſtroying its texture, like a pulp made of rags when ground in the Paper-engine. The graſſy ſhore receives at laſt this Paper-ſtuff manufactured by Nature alone, like the artiſt, who ſcoops in the Paper-mill the prepared materials upon frames, out of the vat, and depoſits it upon hairy felts, in order to preſs and dry it. Mr. Senger is therefore entitled to the thanks of men, who too often overlook the moſt ingenious works of Nature, by giving them hints to fix their thoughts on this phenomenon, which repreſents to us ſo clearly the original fabrication of Paper, and hands down

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to us the firſt and moſt ancient records thereof; in the ineffectual purſuit of which our anceſtors have ſpent many centuries, and could never diſcover it to its full extent. It was left to the laſt year of the 18th century, to prove to the world that a ſtrong Paper can be manufactured from all vegetable ſubſtances, on following thoſe rays which Nature has laid open to our eyes.

It is natural to enquire how this phœnomenon could remain ſo long hidden from the ſearching eye of men; or, if it was known, why did they not make uſe thereof; and learn from it, the uſeful art of making Paper? The more ſo, as this phœnomenon extends itſelf over the whole ſurface of the globe; and as a thinking man, who poſſeſſes a ſpeculating ſpirit, with a great mind not to relax his purſuits by diſappointment, but to perſevere in his undertakings, may be by it ſo eaſily led to the diſcovery of the artificial manufacture

ture of Paper, after ſo many hints have been thrown out by the before quoted authors. Have not many years expired ſince Dr. Schäffer produced a Paper mixed with rags, made from a kind of vegetable which he calls *water-wool*, and which was this *Conferva*?

This river Paper is completely fabricated by Nature, ſo as to be fit for writing or printing, if only taken from the ſurface of the water when ripe, (which is to be aſcertained by taking a handful, ſqueezing the water out, and finding it fibrous,) hung up and dried, and ſmoothed with an iron.

It remains now to ſtate which kind of *Conferva* is the moſt uſeful for making Paper, and may be plentifully obtained. Linnæus ſays that there are 21 ſorts of *Conferva*, which I mean not to diſpute, but to name thoſe that are the fitteſt for the before-mentioned purpoſe, which are: *Conferva rivularis; Conferva bulloſa; Conferva reticu-*

latis. Theſe three can be gathered in abundance in ſummer and autumn, the time when ripe, purified, and united by the warmth of the ſun, by means of oily ſubſtances formed likewiſe in the water by Nature. Mr. Senger ſays, that two children have gathered one thouſand weight in one day.

I have heretofore ſtated the want felt by ſociable men in the earlieſt ages, to diſcover means by which might be preſerved to poſterity uſeful and notable occurrences of time, the progreſs of arts and ſciences, and in general to facilitate traffic amongſt men. Tradition, which for a ſeries of years was a ſubſtitute for writing, did but little in compariſon to this art; many things of great importance were forgotten; many valuable ſciences were loſt, mutilated, or but confuſedly handed down to poſterity. After letters were invented, a beginning was made to give, as it were,

ſpeech

ſpeech to rocks and metals, and to engrave on them memorable events. By degrees, art facilitated this gigantic mode, and taught to exchange this uncommon bulky manner of writing into an eaſier method, and to tranſcribe it on tables, which were ſuperſeded by metals, bones, and wood, until ſkins, barks, &c. were made uſe of. Centuries elapſed before a more convenient material to write upon was diſcovered; and many unſucceſsful experiments were made, and long years of labour were given up by the greateſt men of ſcience, before the diſcovery of the Egyptian *Papyrus*, and the art of making Paper from cotton and linen rags was invented.

The linen-rag Paper, which has ſo much improved and benefited mankind, was by degrees employed to other purpoſes than writing, and naturally very much encreaſed the price of rags, which makes the Paper ſo ſcarce, that ſufficient quantities cannot be

obtained for the uſe of the numerous printing-offices, not only in England, but in all other enlightened countries; and accounts that have been received from various parts of the Continent ſhew that the price of rags will augment rather than abate. Conſiderations on theſe circumſtances induced me to make further trials, and endeavour to accomplish that which had been thought impoſſible by others, and which had baffled the attempts of many ingenious men, notwithſtanding the road had been opened to them by Nature, and the hints of men. My labours and perſeverance have been crowned with ſucceſs.

I have had the ſatisfaction to witneſs the eſtabliſhment of an extenſive Paper-manufactory, ſince the firſt of May 1800, at the Neckinger Mill, Bermondſey, where my invention of re-manufacturing Paper is carried on with great ſucceſs, and where there are already more than 700

reams

reams weekly manufactured, of perfectly clean and white Paper, made without any addition of rags, from old waſte, written and printed Paper; by which the Publick has already been benefited ſo far, that the price of Paper has not riſen otherwiſe than by the additional duty thereupon, and the encreaſed price of labour. And it will not be many weeks before double that quantity will be manufactured at the ſaid mill.

Thus far ſucceeding, my other more extended views, in aſſiduouſly endeavouring to manufacture the moſt perfect Paper from ſtraw, wood, and other vegetables, have been likewiſe ſucceſsful. And I am able to produce to the publick very ſtrong and fine Paper, made thereof, without any addition of other known Paper-ſtuff, notwithſtanding I have not yet had the advantage of making it in a mill, regularly built for ſuch a new undertaking. The Paper whereupon

upon this is printed is an undeniable proof.* It is however only of an inferior quality, being made from the ſtraw in the ſtate it comes from the farm yard, without aſſorting the weeds, and thoſe parts of the ſtraw which have been coloured by the weather. I have uſed this kind of Paper on purpoſe to demonſtrate the progreſs of ſo ſingular an undertaking, and to prove its poſſibility to the world, notwithſtanding the opinion of many ſcientific men, particularly that of the ingenious Breitkopf at Leipzic, that Paper made from ſtraw cannot be uſed for printing. This ſpecimen, and others of a much finer quality which have been manufactured, leave no doubt, that, when the manufactory has been regularly eſtabliſhed with the neceſſary implements, I ſhall make ſtraw Paper in as great perfection as any made from rags; and by ſeveral trials which I have made to change the yellow colour into cream colour, and white, it ſeems to be unqueſ-

* Part of this edition is printed on Straw Paper.

unqueſtionably practicable, which will extend its conſumption, and remove the prejudices which are generally cheriſhed againſt new diſcoveries; notwithſtanding its natural colour is not only pleaſing, but grateful to the eye for writing and printing, principally for muſick-notes by candle-light. Copper-plate printers aſſert that it takes the impreſſion ſuperior to French copper-plate paper, and it has a beautiful effect in landſcapes and pictures, for drawing, and paper-hangings.

In my former edition I ſaid, (p. 79) "I flatter myſelf that my exertions will meet with the approbation and ſupport of the community at large." Since which my expectations have been gratified, not only by the ſanction of the legiſlature, who have been pleaſed to paſs an act of parliament, by which my undertaking has been greatly facilitated, ſo that I am now able to eſtabliſh this manufacture to a conſiderable extent,

extent, but alſo, by the approbation and ſupport of perſons of the firſt reſpectability, who have come forward to patronize it; which is the ſtrongeſt teſt the publick can require of its general utility, and national importance; the laſt of which is certainly of much greater extenſion than by many is conceived; becauſe, by the eſtabliſhment of a large manufacture of this kind, numerous hands of both ſexes, and of all ages, will be employed and gain their livelihood, who now are, or otherwiſe might become, a burthen to the pariſhes in which they reſide; it will increaſe the revenue; it will prevent the neceſsity of ſending large ſums of money out of this kingdom, for the purchaſing of rags;* it will render ſeveral of the

* If from 5,000 to 6,000 loads of ſtraw will be converted annually into Paper, uſed for Paper-hangings, it will be equal to the quantity of rags imported from the continent in 1799. A great part of thoſe rags are uſed for that kind of Paper (elephant,) that being of a ſtronger texture than Engliſh rags. And as Paper-hangings made from

the commodities to be employed in this manufacture more valuable and uſeful than they have hitherto been, (many of which have been thrown away) which of courſe is intereſting to the landed property of this country, as the value of land muſt naturally encreaſe; and it will ultimately reduce the price of Paper.

But whether or not this country can avail itſelf of all the advantages that are likely to reſult from a diſcovery which promiſes to become ſo generally uſeful, muſt, in my humble opinion, intirely depend on thoſe meaſures, which the legiſlature of this country ſhall in their wiſdom think it prudent to adopt, in order to prevent the diſcovery from

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from ſtraw Paper may be manufactured much cheaper to the taſte of the people abroad, than they can make it from rags, this country will be enabled to provide the whole world with it, *at a lower rate than it is poſſible to be manufactured from rags*, and foreigners will be neceſſitated to ſend their money to this country for the purchaſe of it.

from being known to other countries:—a meaſure not undeſerving the attention of the Britiſh government, at this conjuncture, when the ſplendor of its manufactures and commerce is more envied than at any former period of our hiſtory.

By *the ſanction with which the legiſlature has favoured my diſcovery*; by *the ſupport of men of fortune and reſpectability* who have come forward to facilitate my endeavours to eſtabliſh this manufacture on ſuch a ſcale as to make it of importance to the publick; and by *the approbation with which it has been honoured by numerous perſons*; I flatter myſelf to overcome all prejudices againſt this new invented *wood*, *ſtraw*, and *vegetable Paper*, and that I ſhall, by my unremitting perſeverance, bring the diſcovery to the greateſt perfection, and that my efforts will render it eligible for general uſe: then the opinions and judgments, which are inconſiderately or enviouſly circulated to the injury

injury of many new inventions and eſtablishments, will be turned to its advantage, and promote its proſperity, which are the moſt effectual means, not only to prevent a further riſe of the price of Paper, but contribute to its reduction.

It will be productive of the greateſt ſatisfaction, if, by farther reſearches, I can accompliſh the object I have in view, namely, that of manufacturing Paper from vegetables, for the purpoſe of making bank-notes, which by the experiments I have made I am convinced I ſhall be able to effect. A diſcovery of ſuch deſcription muſt be a ſource of great and pleaſant reflection to every philanthropic mind, ſince the opportunities of forgery on the Bank of England, which at preſent exiſt, will be moſt effectually done away, and the publick mind relieved from hearing of ſuch crimes, and of the executions which enſue from the conviction of the offenders. That ſuch will be

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the good conſequences reſulting to the community, from manufacturing Paper of the ſaid materials for the before-mentioned purpoſe, muſt be manifeſt, becauſe the mixture of vegetables from which the Paper would be made might remain a ſecret, if the neceſſary meaſures for that purpoſe are adopted: conſequently no forgery could henceforth be committed on the Bank, as long as ſuch Paper ſhould be uſed in making bank-notes, becauſe the counterfeiting of the Paper cannot take place, as long as the materials from which it is made is unknown, and as long as the Patent granted by *His Majeſty* is in force.

APPENDIX.

APPENDIX.

AS an Appendix to this little Tract, I think it proper to ſubmit a few more remarks on the National Importance of diſcovering materials which can be converted into Paper, and grow ſufficiently abundant in Great Britain, without the neceſſity of importing them from foreign countries.

The following lines are printed upon Paper made from Wood alone, the produce of this country, without any intermixture of rags, waſte paper, bark, ſtraw, or any other vegetable ſubſtance,

from which Paper might be, or has hitherto been manufactured; and of this the moſt ample teſtimony can be given, if neceſſary.

Having thus far ſucceeded in my reſearches, to make an uſeful Paper from one kind of Wood, I doubt not, but, that I ſhall find many others equally eligible for the ſame purpoſe, of which I truſt it will be in my power, within a few weeks, to give indiſputable proof that my expectations have been well founded, and that I have not cheriſhed a viſionary opinion.

Hiſtory furniſhes us with numerous examples of one diſcovery giving birth to others, and, if my ſucceſs of having encreaſed the quantity of Paper materials, by rendering theſe applicable to that which have never been before applied to ſuch a purpoſe, ſhould

ſhould incite active and induſtrious artiſts, to make farther improvements in their various manufactures, my feelings will be amply gratified. Various hints may be ſuggeſted to thoſe who are already acquainted with the properties of Paper, when paſted in lamina on each other; it may, by this means, be made to form a ſubſtance, as durable and more impenetrable than oak.

Having long admired the celebrated manufacture of Mr. *Clay*, at Birmingham, who has demonſtrated to what perfection and beauty it has been brought, it will, in the courſe of time, perhaps not be ſurpriſing to find, that objects of greater conſequence will engage their attention in the ſame purſuit, and prove, that the properties from ſucceſſive layers of Paper, may be found a ſubſtitute for many purpoſes,

for which at preſent foreign Wood is required.

One of the greateſt obſtacles to the improvement and extenſion of this art has been probably the ſcarcity of the raw materials. Now that theſe are found *at home* in ſufficient abundance, means may be found to ſupply manufactures with any quantity required, at reduced prices.

It may probably be ultimately proved, that Paper thus prepared, will be a lighter, neater, and more durable covering for buildings of all kinds, and it is equally true, that the ingredients, with which the cement can be compoſed, will render this ſubſtance not only incombuſtible, bnt more durable than ſlates, tiles, (which in the courſe of time become brittle) and wood in

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its natural ſtate, and incorruptible by inſects. Who can ſay that coach-makers, chair-makers, and cabinet-makers, will not make uſe of it for carriages, chairs, and elegant houſehold furniture, and reflect that a ſubſtance poſſeſſing ſuch ſuperior properties ought to be preferred; having flexibility, hardneſs, and capability of being worked with infinite greater neatneſs and luſtre than wood, which is ſo much affected by the air and weather. Converting wood, ſtraw, and other vegetable ſubſtances into Paper, may therefore be rendered uſeful for a variety of purpoſes; and the ſubſtance of the Wood Paper on which theſe lines are printed, (which is the firſt attempt to make it in a quantity) exhibits an indiſputable proof, that uſeful Paper may be manufactured from the hardeſt part of wood alone, deſtitute of its pith or bark; and, if

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any of the ſuggeſtions here ſtated, as to the application of the manufactured material ſhould be thought reaſonable, experiments of ſome able manufacturers will prove, that this Paper can be again converted into a ſubſtance, more hard and durable than any wood of natural growth.

Conſidering, in its full extent, the numerous uſes to which the diſcovery of making Paper from wood, ſtraw and other vegetables, which always can be obtained in this country at moderate prices, can be applied, it is certainly an invention that merits attention and ſupport. If only fit for the manufacture of inferior ſorts of Paper, and Paper-hangings, this country will be enabled to cope with the whole world in this ſpecies of commerce, on the moſt advantageous terms, and to enrich

enrich herſelf, by opening this new ſource of trade, very lucrative to the revenue, and allowing the manufactured commodity to be ſold for leſs than the preſent price of Paper; whilſt, at the ſame time, it will make ſeveral materials * more valuable, and, by giving employment to thouſands of women and children, thereby eſtabliſh an influx of real wealth into this country.

The wiſdom of the legiſlature has rendered it neceſſary that the ſpecification of every patent ſhould be made public within the ſpace of twenty-eight days, which has been ſometimes extended to ſix months. The patentee's benefit exiſts for fourteen years, and is extremely well protected by the law againſt the infringement of its privileges, by the inhabitants of Great Britain; but it appears very extraordinary, that every

* Saw-duſt, wood-ſhavings, old mattings, &c.

every patent is open for the inſpection of foreigners, and that the patentee remains unprotected with reſpect to them. A pamphlet has been ſuffered to be publiſhed monthly, ſince the year 1794, which deſcribes not only the exiſting patents of the country, but contains complete drawings and deſcriptions of new-invented machines. This pamphlet has been, and will be, immediately tranſlated into the continental languages; a practice which has, no doubt, proved highly detrimental to the revenue and commercial intereſt of this country.

If a patent is obtained for an ingenious invention, which may have coſt the author many years intenſe labour and ſtudy, and the reſult produces great national wealth by the manufacture and exportation of the commodity, the proſpects may be clouded in an

an hour, and all expectation baffled by foreigners reading the ſpecification, who, by erecting ſimilar manufactures abroad, under greater advantages,* deprive the country of the revenue and commerce. If this ſubject was duly weighed, it ſurely might be remedied. It may be aſked, why a patent is to be openly exemplified before its term is expired? for, as it can be of no uſe to the inhabitants of this country, during the ſpace of fourteen years, for what purpoſe is it expoſed? and why are foreigners permitted to reap the benefits to which this country is only entitled? It is undeniable, that it operates as a perpetual diſcouragement to the future efforts of genius, preventing monied men from carrying the moſt valuable diſ-

* They do not want to ſpend money to bring the invention to perfection; and manual labour, building, and rent is cheaper on the Continent.

coveries into effect. The doubtfulneſs of ſucceſs alone ſufficiently damps the ardour, perſeverance, and exertions neceſſarily required in the purſuit of ſkilful and laborious inquiries; but, having ſucceeded to his utmoſt wiſhes and after having incurred very injurious expenſes in the proſecution of his deſign, he is foiled in all his hopes of compenſation, by the expoſure of the means through which the diſcovery has been effected. This conſideration alone ought to weigh with thoſe by whom this evil can be remedied to the individual. But, much as it may be lamented, this injury bears no proportion to the loſſes which the revenue and commerce ſuffer.

It therefore appears impolitic in the laſt degree to expoſe the exemplification of a patent to public diſcloſure, and to be a *deſideratum* of ſuch infinite

finite importance, that the Legiſlature may think of ſome method to prevent the art from being divulged in a patent, and being purloined by foreigners, who are jealous of the greatneſs of the manufactures, commerce, and navigation, of Great Britain.

The importance of this is ſufficiently obvious by daily experience: and it ſeems very aſtoniſhing that the Legiſlature has not before taken it up as a general meaſure; as it is not only a great hardſhip, but an act of injuſtice, that the people of this country ſhould be reſtrained from the uſe of inventions, for which patents have been granted, for a term of fourteen years, which foreigners can immediately avail themſelves of abroad, by procuring copies of the ſpecifications inrolled here, which it is notorious they are in the daily habit of doing, and which ſtands proved in the Report of

laſt Seſſions of Parliament by the Committee, to be conſidered by them as a matter of great importance, from their remitting money to Bankers in this kingdom to pay perſons for collecting and ſending over particulars of our Diſcoveries and Manufactures. One cannot help obſerving the impolicy of that legiſlative act, which declares it a crime for any ſubject or other perſon in this realm to ſend abroad any machine or other apparatus uſed in our manufactures: yet permits written and printed copies of the particulars of inventions, and prints of machinery, to be daily tranſmitted abroad: nay, ſuffers a work monthly to be publiſhed in this metropolis, avowing itſelf to be a deſcription of inventions and diſcoveries, and the mode in which they are effected, together with the plates of all the machinery, which publication is tranſlated abroad in different languages. Is it to be contended that a

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ſkilful mechanic cannot make a machine from a drawing and complete deſcription of machinery, but only from the actual machine itſelf? The only objection that ſeems to oppoſe itſelf to this meaſure is, that it would be a hardſhip to puniſh a man for an infringement of an invention, the mode of carrying on which, he has not an opportunity of inſpecting before committing the act, and therefore could not intentionally have infringed, but of which he would have had the previous inſpection, if the ſpecification was inrolled as directed. The anſwer to which is, that particular and private inconvenience ought to give way to general good; but here, (by my patent) that ſacrifice is not required to be made, and I think there will not any real inconvenience be ſuſtained by this meaſure being generally adopted for all patents which may be granted.

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My patent being for making Paper from Straw, &c. during the term of fourteen years; no perſon has any right during that period to make it from ſuch raw materials as are deſcribed in my patent; and I have proved to the Committee of both Houſes of Parliament by ſatisfactory evidence, that the perfect Paper exhibited there was made ſolely from the ſubſtances mentioned in the patent: but, ſuppoſing a perſon to have diſcovered a new mode of making Paper from Straw, much more uſeful and beneficial than the preſent, and that it was neceſſary he ſhould ſee the exemplification of mine, to ſhew that his is original, and not an infringement on my invention, he has only to apply to the Lord High-Chancellor, whom I humbly ſubmit ſhould have the control over the keepers of my exemplification, and on verifying the facts, he would immediately direct an inſpection. I truſt the

Legiſlature

Legiſlature will not eſteem unworthy of their notice my obſervation for the benefit of the country, revenue and commerce.

FINIS.